

# Human Dimensions of Asian Security

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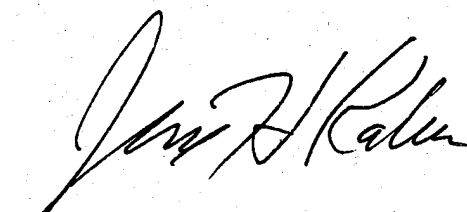
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# Contents

<b>Summary</b> . . . . .	1
Population growth . . . . .	2
Age structure and dependency . . . . .	2
Morbidity and mortality . . . . .	3
International migration . . . . .	4
Ethnic, religious, and caste divisions . . . . .	5
Population and food . . . . .	5
Fish supply . . . . .	6
Water . . . . .	7
<b>Introduction</b> . . . . .	9
<b>Population growth and pressures</b> . . . . .	13
<b>Impacts of changing demographic profiles</b> . . . . .	21
Overall dependency ratios and child dependency . . . . .	21
The "youth bulge": young adults, ages 15 to 24 . . . . .	22
Prime working ages . . . . .	27
Population aging . . . . .	28
Ethnic compositions and trends . . . . .	29
<b>Health and mortality</b> . . . . .	35
Catastrophic mortality—causes and consequences . . . . .	35
AIDS epidemic in Asia . . . . .	37
Other public health trends . . . . .	48
<b>International migration</b> . . . . .	51
Asian international migration—numbers and characteristics . . . . .	51
Refugees . . . . .	54
Illegal Asian international migration . . . . .	57
Impact of migration on sending and receiving countries . . . . .	59
Future international migration . . . . .	62

<b>Population growth, food production, and economic growth. . . . .</b>	<b>63</b>
<b>Food and water supply . . . . .</b>	<b>65</b>
Agricultural products . . . . .	65
Marine food resources . . . . .	87
Water supply . . . . .	103
<b>Key findings and conclusions . . . . .</b>	<b>113</b>
Overview . . . . .	113
Country profiles . . . . .	117
<b>Appendix: Data tables . . . . .</b>	<b>131</b>
<b>Bibliography . . . . .</b>	<b>155</b>
<b>List of figures . . . . .</b>	<b>167</b>
<b>List of tables . . . . .</b>	<b>171</b>

## Summary

The Commander, Seventh Fleet asked CNA to assess the security environment of the Asia-Pacific Region (APR) between 1995 and 2010. This research memorandum addresses trends in those demographic, health, social, agricultural, and sustenance issues with potential effects for security throughout the region. The project's final report, *The Dynamics of Security in the Asia-Pacific Region* (CNA Research Memorandum 95-172, January 1996), discusses the implications of these trends (and of other trends in the region) for U.S. forces, particularly the Navy. Data presented are for the most recent years or decades, and projections are for the 15-year period 1995-2010 unless otherwise specified.

In recent decades, large parts of the Asia-Pacific Region have broken out of the cycle of poverty, illiteracy, and rapid population growth to achieve sustained economic growth on a per capita basis. Population will continue to grow in almost all APR countries in the coming 15 years, straining existing systems that supply jobs, food, water, education, health care, and housing. Most APR governments and economies are responding to this challenge well enough to maintain per capita supply of these basic needs. If population growth were slower, living standards would increase further. Where production and availability of critical goods and services are falling behind population growth, discontent and instability are possible.

Where population is growing and living standards are rising, the demand for more and higher quality food and other consumption goods escalates. In some cases, nations will turn to foreign suppliers, increasing international competition for resources. For example, in China, potentially arable land of reasonable quality is almost all in use and yields are already high, so food and feed imports are likely to greatly increase.

Rapid changes in Asia are not an immediate, direct threat to Asian security. They are background trends to be watched and taken into account in assessing security conditions.

## **Population growth**

Numerous APR countries have reduced their population growth rates to about 2 percent per year, which represents success in lowering fertility and reducing the proportion of increments to economic output that must be devoted to maintaining current living standards. These partial demographic success stories include North Korea in Northeast Asia; Burma (Myanmar), Indonesia, Malaysia, the Philippines, and Vietnam in Southeast Asia; and Bangladesh and India in Indian Ocean/South Asia.

The top demographic success stories of the APR, measured by a low population growth rate of about 1 percent per year (doubling time = 70 years) no matter how such low fertility was achieved, include the populous developing areas of the China mainland, Taiwan, and South Korea in Northeast Asia; Singapore and Thailand in Southeast Asia; and Sri Lanka in South Asia.

The more developed countries and areas of the Asia-Pacific Region generally have low population growth rates: close to 0 in Hong Kong and Japan, and around 1 percent in Australia and New Zealand.

## **Age structure and dependency**

Certain characteristics of an age structure can put stress on economic, social, and political systems or can ease pressure on the systems. The rapid demographic transitions taking place in the APR are causing sharply shifting age structures. The high child-dependency ratios and the need to provide more basic education in the Philippines, India, and Bangladesh have resulted in increasing proportions of the GNP being devoted to public education expenditures. The rapid aging of Japan's population in the coming decades will strain Japan's pension systems, provision of health care, and personal support systems for the elderly.

A bulge in youth and young-adult age groups may coincide with severe unemployment, underemployment, ethnic or religious discrimination, or other forces that might be a festering or explosive combination. The available data are inadequate for pinpointing exactly when and whether such combinations of conditions will foster unrest; however, in the Philippines, Indonesia, Vietnam, and Sri Lanka, high unemployment and a youth bulge in the age structure are both present. In India, a high proportion of young adults and major underemployment coexist.

Although growth in young and elderly populations may strain a country's social support systems, increases in the working ages—generally seen as a positive factor—require a growing economy in order to provide jobs. The China mainland is entering what its demographers see as a “golden age” in its age structure—low child and aged dependency, reduced proportions of the population in teen and young-adult ages, and an unusually high proportion of the population in the potentially most productive working ages. Despite good prospects for continued economic growth, in the 1990s and at the turn of the century, China has and is projected to have between 60 million and 200 million surplus workers in agriculture and about 17 million surplus state sector industrial workers.

## **Morbidity and mortality**

Death rates are generally low in the APR, but catastrophic mortality can occur as a result of natural or man-made disasters. Bangladesh is particularly vulnerable to massive flooding and to cyclones that inundate large portions of the country and threaten or kill hundreds of thousands of people. Many Pacific Rim countries are vulnerable to earthquakes. If humanitarian relief becomes a stronger part of the U.S. government or military mission, many of the continual disasters that strike in the APR will make the affected countries candidates for increased assistance.

The HIV/AIDS pandemic came late to the APR but is spreading faster in parts of Asia than was the case in Africa, Latin America, or the United States. Thailand now has a major epidemic among the general heterosexual population, based on data on HIV status of young

military recruits and pregnant women. Projections of the Thai AIDS epidemic suggest that the death rate will shoot up, young and middle-aged adults will become ill and die in massive numbers, and economic and family costs could be staggering.

The HIV/AIDS epidemic is also spreading in India's coastal cities and capital city—first among prostitutes and now the general population. Burma is very hard hit among drug users and prostitutes, with low-risk populations now being affected. It is likely that the HIV virus will spread farther in Thailand, India, Burma, and Cambodia, and that other parts of South and Southeast Asia will be next. The epidemic in Asia is now spreading to the general population primarily through commercial sex. Internal and international migration of unaccompanied male workers, female workers in sex-related occupations, and tourists seeking sex is spreading the epidemic far beyond its original APR locations.

## **International migration**

Asian countries have generated millions of refugees in recent decades. Most of the causes of these refugee flows have been overcome or at least mitigated—civil and international war in Vietnam, genocide in Cambodia, war in Afghanistan. Many emigrants who flee poor countries and claim refugee status today are being classified as economic migrants, and some are being repatriated to their countries of origin.

Labor migrants from Asian countries go primarily to the Middle East, but more and more workers are migrating within Asia. Many are contract workers, but perhaps more are illegal international migrants. The major flows are workers from poorer countries of South and Southeast Asia to richer countries of East and Southeast Asia and the mostly illegal migrants from China to other countries of East Asia.

International migration in Asia serves the economic needs of the migrants, the sending countries, and the receiving countries, but there are some negative side effects. Disease, especially the HIV/AIDS epidemic, is being spread by migrants within Asia. Ethnic,



cultural, and religious unrest can erupt where there are migrants that come from a different cultural and language area.

## **Ethnic, religious, and caste divisions**

Some parts of Asia are extraordinarily homogeneous—Japan, both Koreas, Taiwan. Some countries are made up of two or more major religious or language or ethnic groups—Malaysia, Singapore, Sri Lanka—and a delicate balancing act is required to avoid conflict. Some countries have a dominant culture but also minority ethnic or religious groups who may be restive—China, the Philippines, Bangladesh, Thailand. Finally, Asia includes several countries that are amazingly diverse, primarily India and, less strikingly, Indonesia.

Explosive Muslim-Hindu conflict erupts frequently in India, between India and Pakistan, and between India and Bangladesh. Within India, caste divisions cause festering resentments and occasional unrest as well. Because these struggles show few signs of abating, it is necessary to factor in continuing ethnic and religious conflict in assessing the prospects for development and modernization in the Indian Ocean/South Asian countries.

## **Population and food**

Rising per capita income in many Asian countries is increasing demand for more varied and higher quality foods. Increase in food demand is not just directly proportional to population growth: more prosperity means more demand for meat, dairy products, seafood, vegetables and fruits, oilseeds, and delicacies. If arable land or water supplies are too scarce to meet such food demand, more food imports are likely to be necessary.

Per capita grain production and availability of calories and protein are still increasing in most of the APR countries. Most countries, even China and India, have enough slack in their food production systems to further increase yields using more fertilizer, irrigation, and high-yielding seeds. This capacity will be expanded when a new “super rice” is introduced after the turn of the century. This technical

possibility could be derailed, however, by political chaos, inability to afford the expensive inputs required, or other non-technical factors.

Some other APR countries, however, have fallen behind. The annual growth rate of agricultural production dropped sharply between the 1970s and 1980s in Burma and the Philippines. Food production per capita declined between 1979 and 1992 in Bangladesh as well. Sri Lanka lost ground due to warfare.

Most authoritative projections see moderately increased grain import needs for the APR, mostly dominated by China's requirements. Current projections suggest that, between now and 2010, Asia's staple food requirements will be met by increased production in APR countries and by a higher but manageable level of imports. Even if China's need to import feed grains increases more than anyone has projected during the coming 15-year period, land-rich countries such as the United States could shift idle land back into production. China's growing food and feed imports would increase Pacific maritime traffic carrying bulk freight.

China's demand for meats and feed grain can be expected to strongly affect world food markets, possibly squeezing out poorer countries from world market supplies. A few countries in South and Southeast Asia are likely to be living on the margin for the next several decades.

Though food shortages are not foreseen in most of Asia, there could continue to be pockets where food is scarce. This may happen where warfare disrupts production, where poverty hinders the modernization of agriculture, or where rapid population growth and environmental deterioration overwhelm the system.

## **Fish supply**

Fish makes up a larger portion of the diet and the protein supply in many APR countries than in most parts of the world—as a share of animal protein consumed, fish constitutes 28 percent in the Far East in contrast to only 7 percent in North America.

Asian countries catch most of the world's fish. The catch has been increasing in the Indian Ocean, but declining in all parts of the

Pacific as more intensive competition for the available fish depletes stocks. Conflict has arisen among long-distance fishing fleets, short-distance fishers dependent on fish supplies close to home, and countries determined to enforce their exclusive economic zones for fishing purposes. Prospects are not good for full international cooperation with regard to exploitation of what is seen as a public good available for the taking from the commons.

An alternative to catching fish from oceans and rivers is aquaculture. China is the world leader in fish farming, and is projecting future increased aquatic production by this means. Other APR countries have the potential to follow China's example.

## **Water**

With continuing population growth, economic development, and rising living standards, the demand for water all over Asia is increasing. There is water scarcity or stress in Singapore, South Korea, north China, northwest India, and parts of Thailand, Malaysia, and Indonesia. The overwhelming importance of water, its growing scarcity, and the rising costs of cleaning up polluted water and generating new water supplies combine to make conflicts over water ever more likely.

## Introduction

When assessing the factors and trends that will affect Asian security in the coming decade or two, it is important not to ignore the underlying human transitions that are taking place and that have the potential to undermine the stability of the region. Population growth places constant pressure on Asia's governments and peoples to steadily increase production of everything just to stay in place on a per capita basis. Growing or procuring an ever-increasing supply of food is not automatic; adequate water supplies are uncertain. Indeed, providing more food is increasingly difficult as arable land is lost to cities, houses, and reservoirs. The competition for land, food, and water caused by population growth can awaken otherwise dormant tensions or can exacerbate existing conflicts.

Rapidly shifting age structures can also be disruptive. Each age group generates special requirements. Imbalances among major age groups can create intergenerational competition for resources. Children require health and education services; a bulge in the age structure among teens and young adults strains a country's ability to generate enough new jobs; the elderly require health and financial support. While economic growth allows countries to better address the needs of all these groups, improved conditions also generate higher expectations: more and higher quality education, better jobs, a more secure old age.

When populations grow and economies develop, some people who used to be geographically immobile start to move. The most ambitious, the least satisfied, or the most desperate migrate to more advanced rural places, to already crowded cities, and sometimes abroad. This ever-increasing movement can act as a safety valve, giving unemployed and restless people opportunities to earn money. Migrants are often docile, because they are vulnerable to being dislodged from their precarious foothold in their adopted homes if they are disruptive. On the other hand, migrants are away from many

traditional constraints on their behavior. A high proportion are young adults who have the potential for hard work, but also for criminal or disorderly behavior. Huge concentrations of young adults in cities have much greater political salience than when they were diffused in villages.

Other demographic and social factors can disrupt regional security. Ethnic or religious tensions, sometimes contained, might explode into civil war under certain conditions. Epidemics, if not promptly contained, can terrorize populations and send people fleeing for their lives. The newest world pandemic, HIV/AIDS, targets the sexually active; in Asia, prostitutes and their clients (including military personnel) are particularly vulnerable.

During the decades from the 1950s to the 1980s, Asia for the most part weathered massive demographic and social transitions surprisingly well. For example, from the beginning to the end of the 1970s, most countries of Asia and the Pacific overcame rapid population growth with even greater increases in economic growth and food production.<sup>1</sup> These successes were mightily assisted by the green revolution in agriculture, which was implemented beginning in the 1960s. But by the 1980s, the agricultural sector in the majority of Asia-Pacific countries had already adopted the easiest yield-increasing innovations. Further improvements in yield were predicted to be much more difficult and expensive to achieve; those predictions were proved correct, as yield increases slowed in the late 1980s.

Another Asian success story was the march toward universal basic literacy and universal attainment of some primary education by the huge cohorts of children born in the 1950s and succeeding decades. Now young adults, they hope for better lives than experienced by earlier generations. Providing any employment for these massive numbers of entrants to the labor force has been a tough challenge, but to provide nonagricultural jobs for them has been an elusive goal in many APR countries. Unemployment and underemployment beset

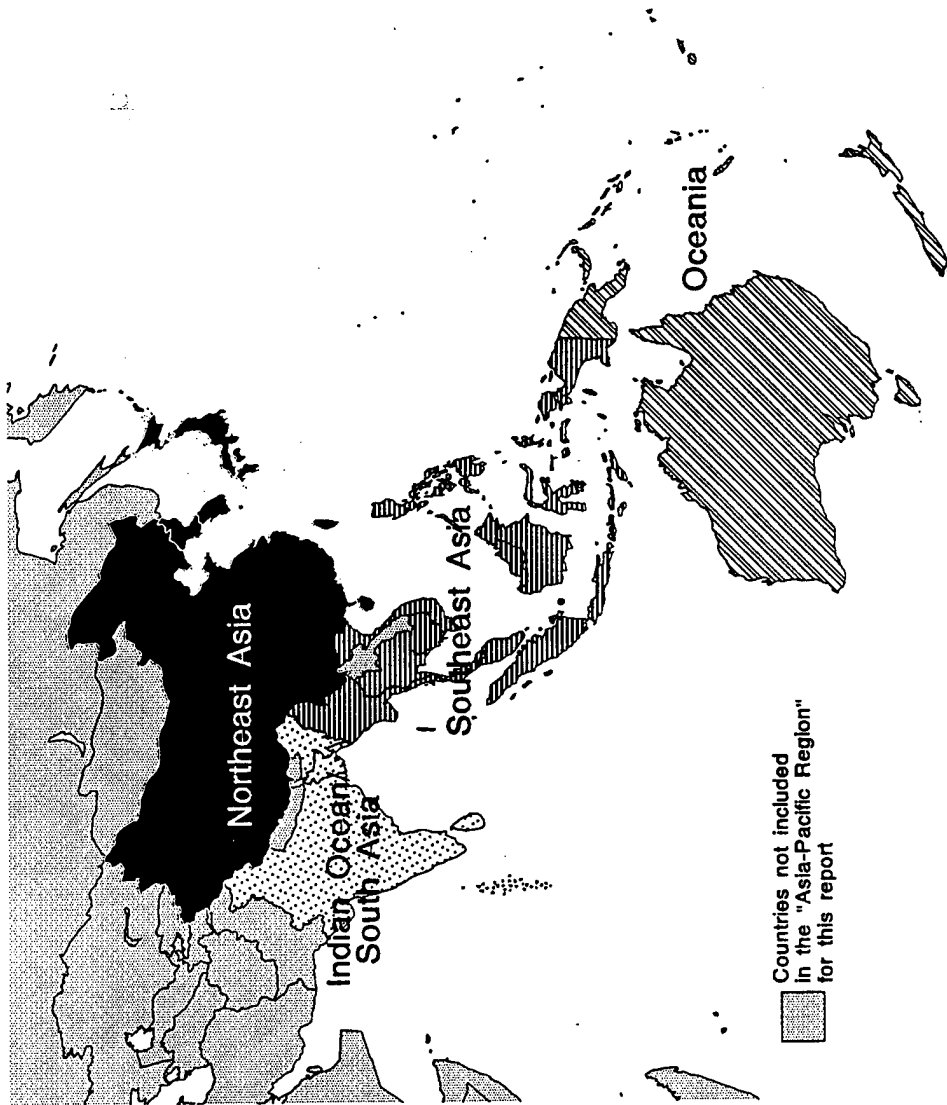
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1. Banister, 1982, 54-59. (Footnotes refer to publications listed in the Bibliography, starting on p. 155.)

many millions of young adults in the Asia-Pacific Region. Disillusionment and disruption can result from their unmet expectations.

This report is forward-looking in its purpose. Therefore, our temporal focus includes trends as seen in the most recent decade, assessments of the current situation, and projections for the period from today through about 2010, or for a longer period where appropriate. Our scope encompasses the four APR sub-regions shown on figure 1.

Figure 1. Sub-regions of the Asia-Pacific Region



## Population growth and pressures

The Asia-Pacific Region is a major demographic force in the world, currently home to more than half of the world's population (figure 2 and table 1<sup>2</sup>). Two-thirds of the population of the region is accounted for by the two most populous countries in the world, China and India.

In most APR countries, death rates dropped in the post-world War II decades. The subsequent rapid population growth has since been mitigated by reduced birth rates. The Asian fertility transition has been driven by rising prosperity and urbanization, as well as by vigorous family planning programs. Fertility in the region has fallen to three births per woman from the historical level of about six or seven. In many countries where progress in reducing birth rates had been slow and discouraging for decades, real and dramatic declines in fertility have recently been achieved.

Further fertility reduction is expected in the Asia-Pacific Region as a whole and in numerous APR countries in future decades. But the pace of fertility change is uncertain, in part because of the enormous range of population policies now being implemented in Asia. Many governments continue to promote fertility control and reduction, but several governments have decided that their fertility transition has gone far enough and have adopted neutral or pronatalist policies (South Korea, Taiwan, Malaysia, Singapore). Some countries that retain high fertility levels also are pronatalist (for example, Cambodia).

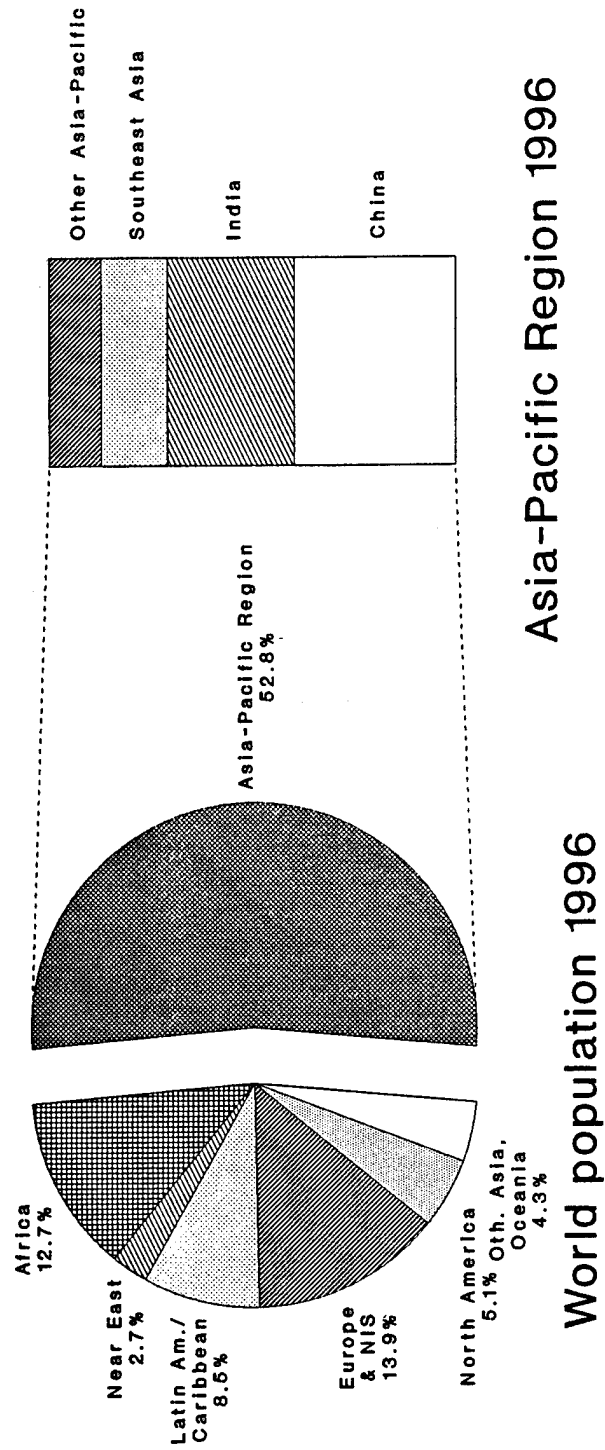
As seen in table 1, the population of the Asia-Pacific Region will continue to grow for at least the next 15 years. Table 2 shows that the rates of population growth are projected to decline over the next 15 years in all countries in the region. These population projections were produced at the U.S. Bureau of the Census after careful evaluation of all

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2. All tables appear together in the appendix.



Figure 2. Population geography: World  
and Asia-Pacific Region 1996



Source: U.S. Bureau of the Census, International Data Base.

the available population data from each country, adjustment of data when needed, assessment of recent trends, and derivation of the most reasonable assumptions for future decades. Even so, any population projection could be slightly incorrect if real fertility, mortality, or migration trends deviate from assumed trends. Fortunately, every national population has such built-in population momentum, based on its age-sex structure, mortality, and fertility at a point in time, that there can be a high degree of confidence about population size and growth for projections looking 15 years into the future.

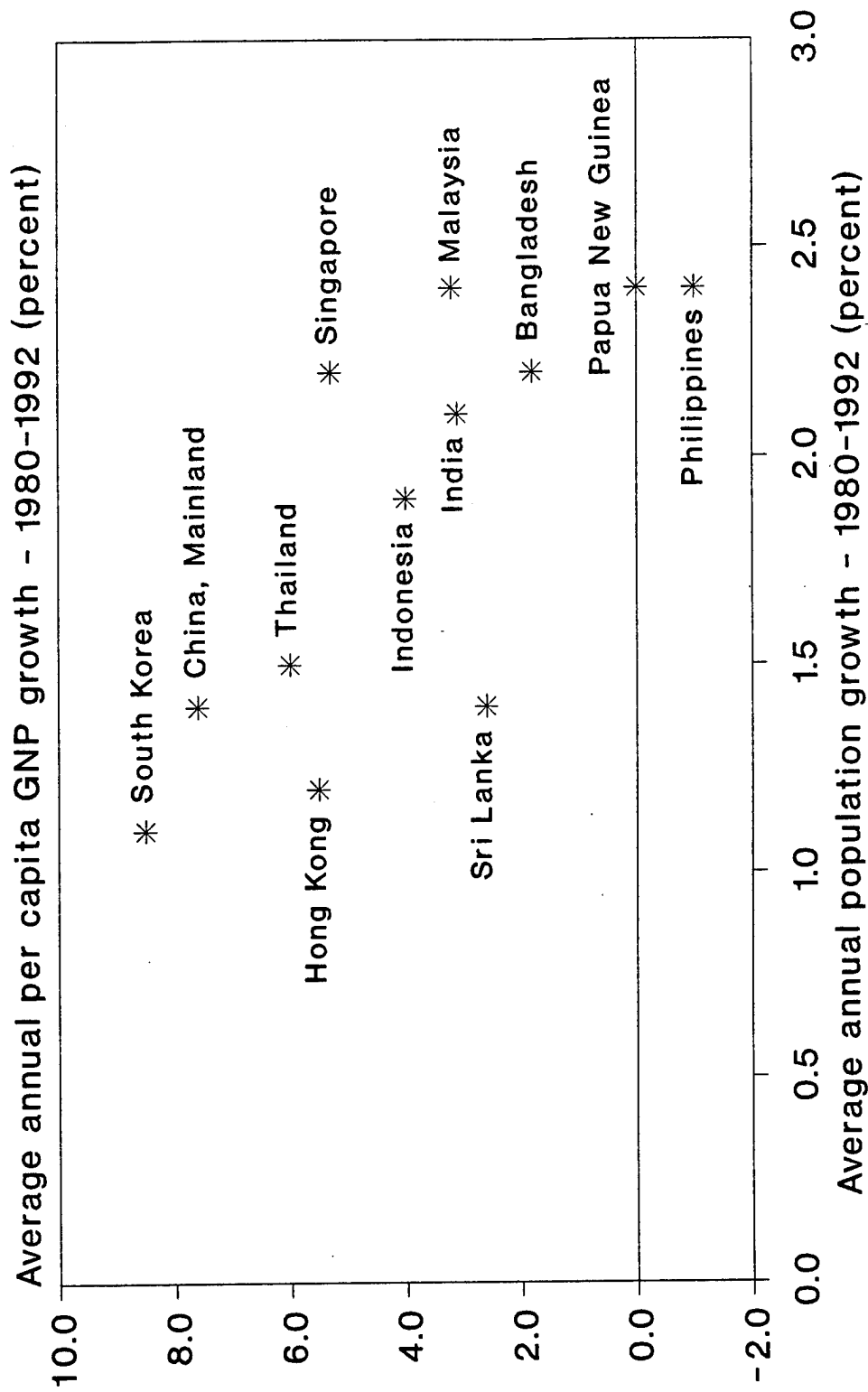
The APR population continues growing because of fertility above replacement level and because high proportions of most national populations are in the childbearing ages. The region's population growth rate is expected to decline from 1.4 percent per year in 1990-95 to around 1 percent in the early decades of the coming century (table 2). The 1995 APR population is expected to increase by 18 percent as of the year 2010.

For the region as a whole, the projected increase over the next 15 years is about 500 million people. Stated another way, the annual increments over the next 15 years are the equivalent of adding more than the current population of California to the Asia-Pacific Region each year (table 3). Because of India's higher growth rate, it is already adding more people per year to its population than is China.

The countries of the region must mobilize to provide food, water, shelter, clothing, jobs, education, and health care for these increments to their populations over the next 15 years. This will be especially difficult for the countries where a slow decline in the population growth rate (Burma, Cambodia, Papua New Guinea) means that greater numbers of people will be added to their populations each year, over the same time period (table 3).

A potential benefit of population growth is that a larger population could provide needed workers and a larger market. On the other hand, population growth can have a negative effect on per capita economic gains, overwhelming economic growth so that each person has less. Figure 3 shows the relationship between the population growth rate and the growth in per capita GNP for the major developing countries in the region, revealing a strong negative relationship. The

Figure 3. Average annual growth of population and GNP per capita for selected developing countries in the Asia-Pacific Region



Sources: U.S. Bureau of the Census, International Data Base, and World Bank, 1994, table 1.

countries with the highest population growth rates in the 1980s were the ones with the lowest per capita economic growth rates, which slowed their development prospects.

As the populations of the Asia-Pacific Region countries have increased, many rural residents have moved to cities and towns. One-third of the APR population now lives in urban areas (37 percent in Northeast Asia, 33 percent in Southeast Asia, 26 percent in Indian Ocean/South Asia, and 74 percent in Oceania). The urban population of the APR, already almost a billion people, will increase by half again to 1.5 billion by 2010 (figure 4 and table 4).

Rapid population growth and urbanization in the APR have resulted in densely populated urban areas. Of the world's cities with a built-up area population of 2 million or more in 1992, eight had population densities of more than 100,000 per square mile, and seven of those were in the APR (table 5). These and other high-density cities will continue to have a hard time providing needed services to the residents, including provision of fresh water, trash removal, and sewage processing, and will have to cope with the inevitable air pollution that results from such high-density living.

Several measures of air pollution indicate that the problem is severe in Asian cities. For example, 12 Asian cities are among the 15 cities worldwide with the highest levels of particulate matter.<sup>3</sup> Asia as a whole already has higher sulphur dioxide emissions than the United States, and is projected to exceed the level produced in Europe before the end of this decade.<sup>4</sup> Carbon dioxide emissions for China rose at an average annual rate of 5.2 percent between 1980 and 1989, while the growth of emissions was 1.2 percent for Japan and 0.6 percent for the United States.<sup>5</sup>

Further concentration of population in the mega-cities of Asia and the Pacific is foreseen. As of the mid 1990s, 8 of the world's 15 largest

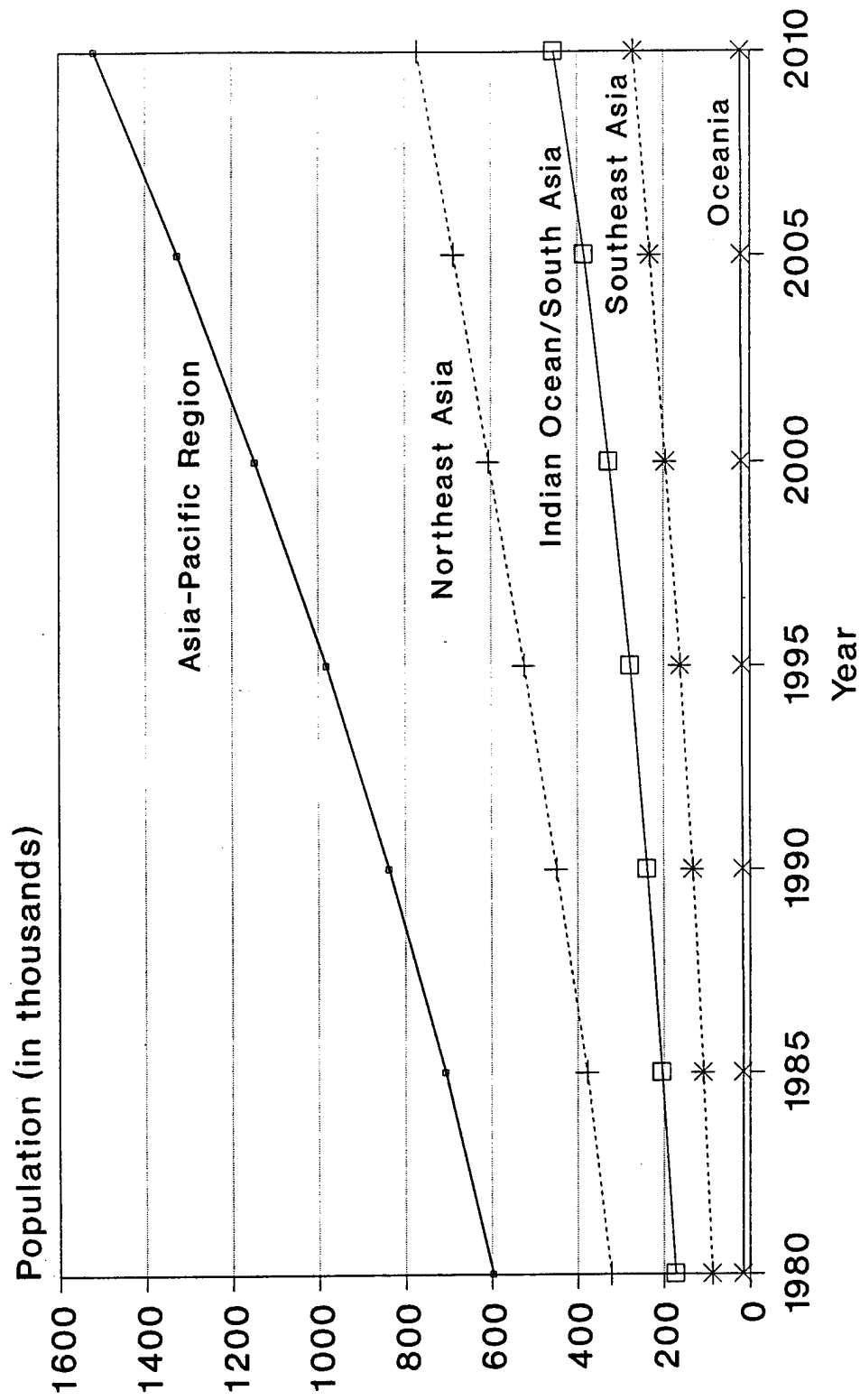
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3. Brandon and Ramankutty, 1993, 22.

4. Brandon and Ramankutty, 1993, 25.

5. U.S. Central Intelligence Agency, 1993, table 141.

Figure 4. Reported and projected urban populations, Asia-Pacific Region and sub-regions: 1980-2010



Source: Table 4.

urban agglomerations are in the APR (Tokyo, Shanghai, Beijing, Seoul, and Osaka in Northeast Asia; Jakarta in Southeast Asia; Bombay and Calcutta in Indian Ocean/South Asia). By 2010, all these mega-cities are likely to be far more populous than today, and the top 15 urban agglomerations may then include Tianjin in Northeast Asia and Dhaka in Indian Ocean/South Asia.<sup>6</sup>

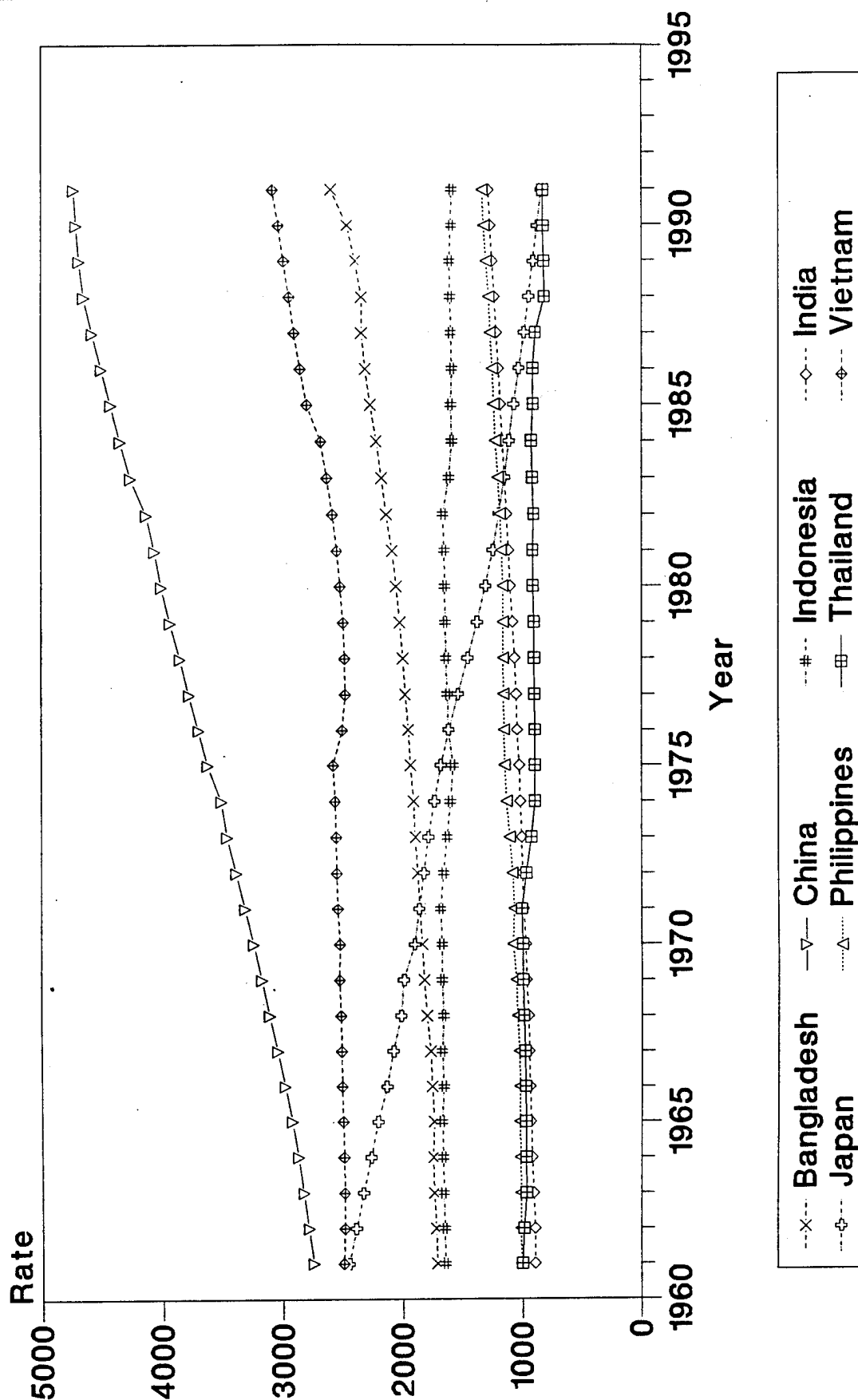
Despite rapid urbanization in the region, the “density” of the agricultural labor force is still increasing in most countries in the region. As shown in figure 5, China and Bangladesh experienced rapid increases in the number of agricultural laborers per thousand hectares of agricultural land in recent decades. Vietnam, India, and the Philippines also saw increases in their agricultural population density. What this means for these populous countries is that their population increases are not being absorbed by the modern sector fast enough; so the excess workers have to resort to work in the agricultural sector, thus increasing the ranks of the rural underemployed. China in particular has used the agricultural sector as the residual labor sink for decades, and has blocked or discouraged the movement of surplus workers to urban areas. This policy, combined with rapid population growth, resulted in an increase over 30 years from 2,743 to 4,728 agricultural laborers per thousand hectares of arable and permanent cropland, an astonishing 72-percent increase in the labor intensity of its farming per unit of cropland.<sup>7</sup>

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6. UNPD, 1995, 3-8.

7. USDA-ERS, 1993b.

**Figure 5. Agricultural labor force per 1,000 hectares: 1961-1991**



Note: This index is the ratio of the economically active population in agriculture to the arable and permanent cropland.  
Source: USDA-ERS, 1993b.

## **Impacts of changing demographic profiles**

It is important to take into account the stresses caused by certain characteristics of different population age-sex structures, and also by rapid shifts in local or national population profiles. However, it is incorrect to assume that certain patterns of population age structure are invariably associated with stability, security, or economic success in a society, and that other types of age distributions predictably cause unrest, economic deterioration, or security problems. For instance, a smooth age structure with the preponderance of the population in the most productive working ages and with low child and aged dependency does not inevitably cause favorable economic and political results. Nor does a "youth bulge," with a high proportion of the population in the late teens and early twenties, necessarily signal a social crisis.

### **Overall dependency ratios and child dependency**

In the decades since World War II, most Asian and Pacific countries maintained high dependency ratios until after their populations began sustained fertility declines. Their populations were young, with high proportions of the total population in the childhood ages. In APR countries that still have high fertility, or where fertility has declined very recently, there are between 70 and 95 dependents per hundred persons in the working ages (defined here as ages 15-64). Table 6 shows that Burma, Cambodia, the Philippines, Vietnam, Bangladesh, and Papua New Guinea still have high dependency ratios.

Because the high overall dependency is due to high fertility and resulting growth of the population at the youngest ages, the pattern of child-dependency ratios (table 7) for the developing countries matches closely the overall dependency ratios. This burden is felt most significantly in the form of expenditures for education. Rising



levels of education incur costs in two ways: direct payment for educational services, and reduced economic production by children who are attending school rather than working on farms or in other production activities. Changes in educational costs as a percent of GNP for selected countries are shown in table 8. Figure 6 shows that in some countries with the highest child-dependency ratios, public expenditures for education are rising as a percent of GNP.

## **The “youth bulge”: young adults, ages 15 to 24**

Reductions in fertility in recent decades in most countries of the region mean that the high proportions of young adults observed in many countries will be declining over the next 15 years (table 9). However, half of the countries in the region currently have 19 percent or more of the population in the young-adult age group. This can be a highly volatile group, especially when they are confronted with the realities of finding work, institutional blockages to youthful idealism, or inconsistencies between rising expectations and concrete realities.

The Philippines is one of the countries of Asia that combines a high proportion of the population in young-adult ages with a high unemployment rate in those ages. In 1990, 7 percent of the total male labor force was unemployed, but the figure was 12 percent for males ages 15-19 and 14 percent for males ages 20-24. For Filipinas in the labor force, the situation was even worse. In 1990, the total female labor force had a 10-percent unemployment rate, but for young women 15-19, the unemployment rate was 16 percent, and at 20-24, 21 percent.<sup>8</sup>

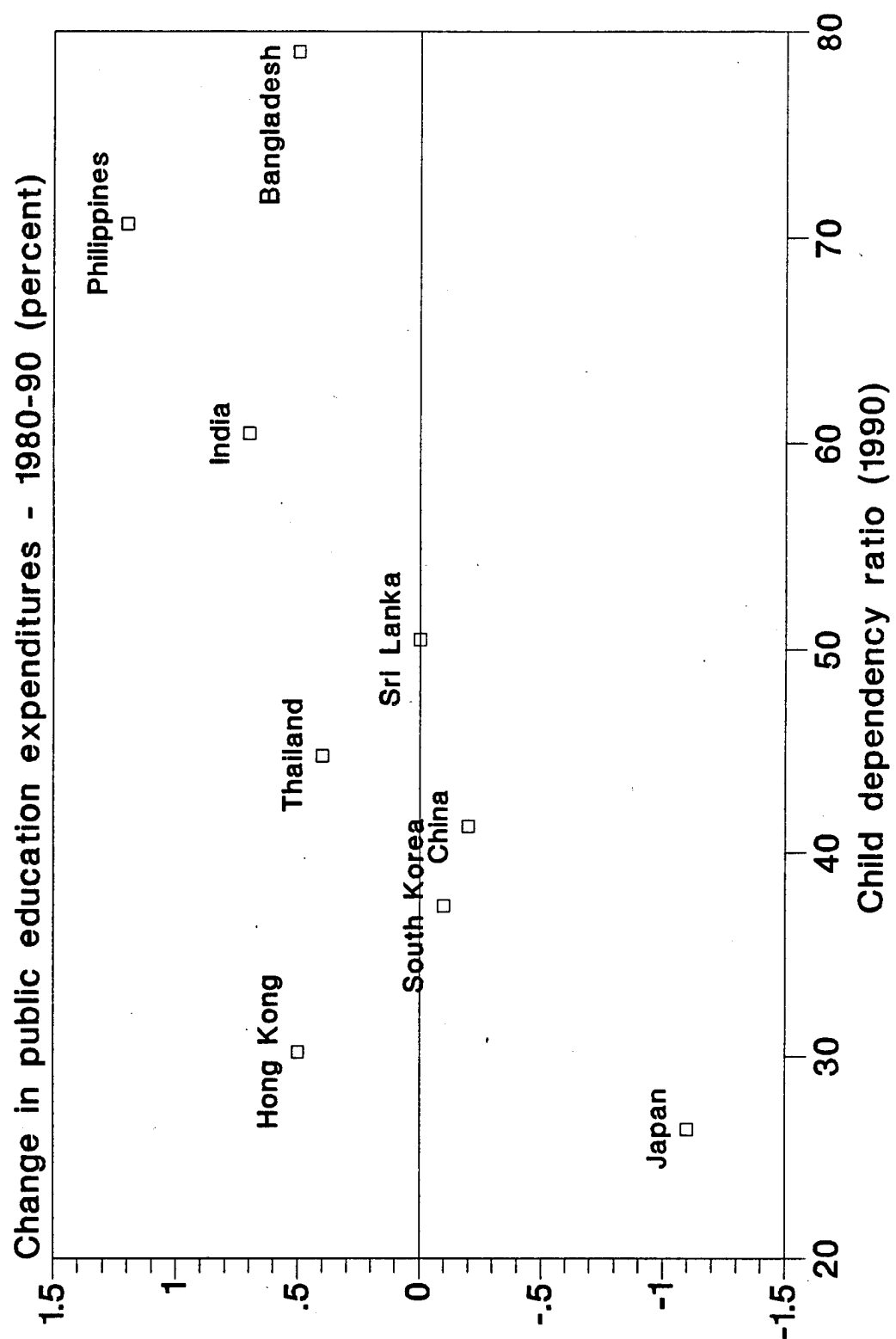
Indonesia also combines a high proportion of population in young-adult ages, with elevated unemployment in those ages. Indonesia shows low overall unemployment of 3 percent for men and 3 percent for women as of 1989, but at young-adult ages the figures were higher—6 percent for males ages 15-19 and 11 percent at ages 20-24. For females the unemployment figures were 7 percent at ages 15-19 and 10 percent at 20-24.<sup>9</sup>

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8. ILO, 1992a, tables 1 and 9B.

9. ILO, 1992a, tables 1 and 9B.

**Figure 6. Changes in public expenditures for education as a percent of GNP (1980-90) and child dependency ratio (1990)**



Source: Tables 7 and 8.

Vietnam also retains a high proportion of population in the young-adult ages. Vietnam's 1989 census reported that 17 percent of the economically active population ages 15-19 were unemployed, but this figure dropped rapidly to 7 percent of those ages 20-24, in comparison to 6 percent for the whole labor force ages 13 and above.<sup>10</sup> However, a series of shocks to Vietnam's economy since that time has very likely increased unemployment among the young and for the whole labor force.<sup>11</sup> Tough austerity measures recommended by the International Monetary Fund and adopted by the Vietnamese government in March 1989 succeeded in cutting inflation but also forced dozens of state enterprises out of business and reportedly idled half a million workers. Unemployment increased further in 1990 as contract workers returned to Vietnam from the Soviet Union, Eastern Europe, and Iraq; soldiers who had returned from Cambodia were demobilized; and over 2,000 small private enterprises went bust after the collapse of hundreds of credit cooperatives. By late 1991, Vietnam had cut its army of one million by half, and another half a million government workers had been laid off. Since then, improvements in Vietnam's economy and expansion of the private sector have generated more jobs and helped stop the deterioration in the employment situation.

In Sri Lanka, a large proportion of the population (19 percent) is in the late teens and early twenties. Sri Lanka had a high unemployment rate of 14 percent for the whole labor force in 1992,<sup>12</sup> and the rates were very likely higher for young adults, but data by age are unavailable.

Unemployment figures are unavailable for the other countries of the Asia-Pacific Region that still have a "youth bulge" in their age structures—North Korea, Burma, Thailand, Bangladesh, and India. The International Labour Organization (ILO) notes that in some South Asian countries for which unemployment data are lacking, underemployment is serious. For example, in India, 22 percent of all male

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10. Banister, 1993, 53.

11. For details see Banister, 1993, 51-56.

12. ILO, 1995, 67.

workers declared themselves available for additional work in the late 1980s, and this figure has been rising.<sup>13</sup>

University students are often a very vocal group, especially with regard to criticizing the government. Examples of this are the pro-democracy movement in China (resulting in the Tiananmen massacre) and anti-government protests in South Korea. University students also are frequent critics of foreign government intervention, such as protests about U.S. involvement in the Philippines.<sup>14</sup>

Secondary and higher education are increasing rapidly in the developing countries of the region, and the success of development will depend in part on these countries' ability to use the rising tide of more-educated young adults. Table 10 shows that the high rates of growth of enrollment in the 1980s are not expected to continue at the same level, but will still generally be higher than the population growth rate. Lack of full use of these educated individuals can lead to unrest, or may force some to migrate out of the country to find suitable work, resulting in a "brain drain."

In addition to having rising economic expectations, the young adults in this group are influenced by foreign social, economic, and political ideas and conditions. The communication revolution is bringing the world closer to all people, as is evidenced by the extremely rapid spread of communication equipment. Between 1980 and 1990 the access to television in some of the developing countries increased dramatically, doubling in most countries and increasing by a factor of 8 in India (figure 7). A 1994 national poll in the China mainland found that 53 percent of respondent households had a black-and-white television and 40 percent had a color TV.<sup>15</sup>

The net overall effect of this new access to the outside world (both beyond the local area and beyond the national boundaries) is not known. On the one hand, images of Asia outside the viewer's

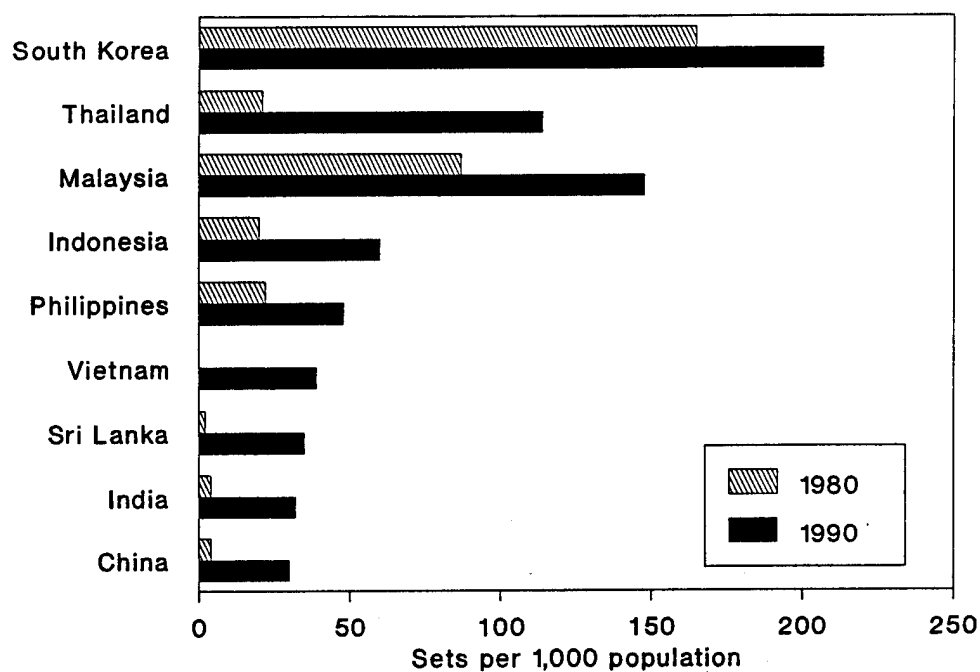
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13. ILO, 1995, 64.

14. Branigin, 1994.

15. Mathews, 1995, A13.

Figure 7. Television sets per 1,000 population



Source: UNESCO, 1993b, table 2.

immediate surroundings may encourage a pan-Asian consciousness that could unite rather than divide Asia. Programs from North America and Europe may be contributing to a fusion of Western and Asian cultures that is hypothesized to be emerging in the Asia-Pacific Region.<sup>16</sup> On the other hand, glimpses of a world of comparative affluence might increase expectations, especially among the young, and exacerbate discontent by highlighting differences between the viewer's life situation and those portrayed on television.

## Prime working ages

A potentially positive result of the fertility declines in recent decades is that the proportion of the population in the prime working ages (defined here as ages 25-64) is expected to increase throughout the next 15 years in all of the major countries of the APR except Japan (table 11). This relative abundance of a vital input to the economy is a mixed blessing: if the labor force can be combined with investment and raw materials, the result could be enhanced economic growth. However, if the economy cannot absorb these workers, the less-than-fully-employed labor force can lead to political instability.

The China mainland provides an example of this dilemma. Although the overall population growth rate is expected to remain low, China's population in the prime working ages is increasing more rapidly than the total population in the 1990s and the first decade of the coming century. But in the early 1990s, China already had between 60 million and 200 million surplus laborers in agriculture.<sup>17</sup> As of 1994, there were 17 million surplus workers in nonagricultural Chinese enterprises.<sup>18</sup> So China has a backlog of around 80 to 220 million people who need productive jobs. In the 5-year period 1995-2000, there will be 69 million additional people in the 25-64 age group. Yet in China's most recent 5-year period of very rapid economic growth (1988-93 year-end data), China generated a net increase of only 59 million

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16. Mahbubani, 1995.

17. Banister and Harbaugh, 1992, 63.

18. Zhongguo Tongxun She, Oct. 4, 1994, 70.

jobs, of which only 41 million were nonagricultural.<sup>19</sup> Therefore, it is unlikely that the China mainland will be able to absorb its huge backlog of unproductive workers into useful work in the near- and medium-term future.

According to the International Labour Organization, the unemployed and underemployed populations as a percent of the total workforce in Asia fell from 58 percent in 1970 to 47 percent in 1985, but the absolute numbers rose from 289 million to 410 million over the same period.<sup>20</sup>

## Population aging

As countries achieve sustained fertility declines and comparatively low mortality, the total population structure gradually ages. That is, the median age of the population rises and the proportion of elderly begins to increase. These are characteristics of a mature population structure. It is beneficial for people to live long lives, yet the economic and health care needs of the elderly place increasing burdens on an aging society.

The Asia-Pacific Region includes few countries with "old" populations (table 12). As of 1995, 14 percent of the population of Japan was in the elderly ages 65 and older. To put this in perspective, most European populations already have a higher percent of their populations in this older age group (for example, Sweden with 17 percent). These European populations are already struggling with the costs of aged dependency, which are compounded by their generous welfare, health, and pension systems. In contrast to Japan and Europe, "only" 13 percent of the United States' population is in the ages 65 and above, yet the U.S. polity is awash in controversy over the costs of entitlements for the elderly (Medicare, Social Security), which are a huge and ever-increasing proportion of government budgets.

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19. SSB, 1994, 83.

20. Brandon and Ramankutty, 1993, 32.

As shown in table 12, rapid aging of Japan's population is projected in the near future, and by 2010 it will be the country with the highest percent ages 65 and over in the world.<sup>21</sup> The rising aged dependency burden will be felt most keenly by Japan's households and families, and also by the economy as a whole. The process of population aging in Australia, New Zealand, and Hong Kong has been less pronounced and will be slower than in Japan (table 12).

In most countries of Asia, the problems associated with population aging are decades in the future. In fact, many Asian countries are now entering what some scholars from the People's Republic of China (PRC) call their "golden age."<sup>22</sup> In mainland China, Taiwan, North and South Korea, Singapore, and Thailand, fertility has dropped to low levels, so the burden of child dependency is dropping fast. The huge bulges in the age structure formed by people born in past years of high fertility are now in young-adult working ages, but they will not reach elderly ages until after 2030. As table 12 shows, most Asia-Pacific countries can expect that no more than 10 percent, and in most countries a much lower percent, of their total populations will be in the elderly age group ages 65 and above by the year 2010. In the coming decade and a half, only Japan, and to a lesser extent the other developed countries of the Asia-Pacific Region, will confront the costs and challenges of rapid population aging.

## **Ethnic compositions and trends**

In recent years, ethnic, tribal, and religious conflicts have engulfed numerous countries throughout the world. In many cases, the relations among the different groups were amicable enough until something triggered a breakdown in their tolerance of or cooperation with one another. In other cases, the hatreds were smoldering and occasionally erupting until suddenly, but not unexpectedly, the violence exploded. These patterns tell us that ethnic or religious conflict can erupt where we least expect it, or where most observers agree that the onset of violent conflict is just a matter of time. It is wise to be

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21. U.S. Bureau of the Census, International Data Base.

22. Banister, 1988.



cautious when predicting future civil wars, international wars, violent oppression of minorities, or other forms of conflict between groups who define themselves as different.

Some observers see the situation in the Asia-Pacific Region as very positive in the spheres of national, ethnic, and religious rivalries. For example, Hong Kong's *South China Morning Post* put out an upbeat December 1994 Christmas message as follows:

The good news is that Asia seems to be doing rather better than elsewhere in the world in channeling national rivalries into the economic sphere, and accommodating religious diversity while seeking to eliminate the conditions that give rise to conflict. Most Asian governments have not only managed to create internal stability, but to maintain harmonious relations with their neighbors. Some of this has been achieved at a cost in terms of individual liberty....With notable exceptions, however, gross systematic human rights violations have been eliminated in much of Asia.<sup>23</sup>

In Asia, some countries are extraordinarily homogeneous by world standards. In such places, we do not expect societal breakdown along lines of nationality, religion, language, or other differentiating characteristics. These countries frequently discriminate against the relatively small proportion of the population who do not fit the national ethnic and cultural mold, but this lesser treatment is not a threat to the stability of the country as a whole. For instance, in Japan, only 0.9 percent of the total population is not ethnically and linguistically Japanese.<sup>24</sup> Members of the Korean minority, who make up 64 percent of the alien population in Japan, are still seen and treated as foreigners, though they came to Japan many decades ago or were born in Japan.<sup>25</sup> In Taiwan, almost the entire population is ethnically Chinese. In South and North Korea, the population is almost completely Korean, except for foreign guest workers in South Korea.

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23. *South China Morning Post*, December 26, 1994.

24. Japan Statistics Bureau, 1992, tables 2-1 and 2-15.

25. Japan Statistics Bureau, 1992, table 2-15.

In mainland China, 92 percent of the total population is Han Chinese, while the minority 8 percent of the total is divided into 55 different nationality groups. Though relations between Han and the minority have often been anything but smooth, the overwhelming numerical dominance of the Han majority has crushed any opposition from disaffected minorities. The government does try to placate and assist the ethnic minority population, for ideological or moral reasons, and also because most of China's ethnic minorities are located near the borders of the PRC. Often the border divides an ethnic group in China from its compatriots in neighboring countries. This has rarely caused international warfare, but it is an irritant to China's national and border provincial governments, as well as to the governments across China's border in Mongolia, Kazakhstan, Nepal, India, Burma (Myanmar), and Vietnam.

China's most salient minority problems are continuing disaffection among many Tibetans and ethnic unrest in Muslim minority areas. In Tibet, a recent influx of entrepreneurial traders and skilled workers from Han Chinese areas is increasing overall prosperity in Tibet while widening the income gap between most Han and most Tibetan residents. There are reports of increasing resentment and bitterness among a widening spectrum of Tibetans.<sup>26</sup> Some Muslim groups in China are becoming more assertive and religious, in response to international trends in Islam, the break-up of the Soviet Union and emergence of Islamic Central Asian countries, and the loosening of central control in China. Clashes and protests have been on the rise.<sup>27</sup> In recent years, China has tightened its laws against and penalties for minority separatist activities.<sup>28</sup> Given the record of the past 45 years, it is likely that minority unrest in China, particularly among the Tibetans and Muslims, will continue.

Some Asian ethnic or religious conflicts have been going on for centuries or a millennium. Even though they are destabilizing and sometimes explosive, the chaos these hatreds cause is a known quantity that the international system has been trying to deal with for some

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26. *Christian Science Monitor*, Nov. 4, 1993, 9; Sun, 1994.

27. Kristof, 1993; Chandra, 1993; Agence France Presse, Jan. 25, 1994.

28. UPI, May 6, 1994.

time. For instance, the frequent Muslim-Hindu violence in India, between India and Pakistan, and between India and Bangladesh is a constant threat to security in South Asia. Examples are terrorist bombings of high-rise buildings in Bombay attributed to Pakistan-aided Islamic radicals<sup>29</sup> and Hindu destruction of the Ayodhya mosque that led to bloody clashes. So far there is no end in sight, and it would be foolhardy to predict a lasting solution to this religious conflict in the coming decade or two. If there is any trend in the 1990s, it is a hardening of animosities between Hindus and Muslims in India, with-rising militancy on both sides.<sup>30</sup>

In addition to deep Hindu-Muslim animosity, India has other sources of internal conflict. Despite education and modernization, there has been an upsurge in caste awareness, leading to protests and deaths.<sup>31</sup> For several years, there were violent tribal clashes between the Kukis and Nagas of the remote northeast Indian state of Manipur bordering Burma,<sup>32</sup> and between tribal groups and Bangladeshi settlers in the northeastern province of Assam.<sup>33</sup>

Another known source of ethnic dissension is the overseas Chinese population living throughout Southeast Asia. These minorities have been mistrusted, hated, blamed, killed, or expelled periodically. Indonesia's slaughter of many of its Chinese residents in the 1960s was a bloody example. Today, the ethnic Chinese population of Indonesia, who constitute only 3 percent of the population, is viewed with resentment and envy because of its economic success.<sup>34</sup> In 1994, labor protests at Medan in North Sumatra turned into racially charged anti-Chinese riots. Vietnam's oppression and expulsion of hundreds of thousands of its Chinese minority citizens in the late

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29. UPI, March 27, 1993.

30. Wagstyl, 1993.

31. Wagstyl, 1994, 4.

32. Reuters World Service, August 19, 1994.

33. Burns, 1994.

34. Jacob, 1994, 14.

1970s and early 1980s contributed to border skirmishes with China and to Vietnam's pariah status among its neighbors.

Some overseas Chinese business people have recently had greater contact with mainland China in order to engage in trade, investment, or tourism. In some places, such as Indonesia, this trend has renewed old suspicions that the Chinese minority is really an extension of China's influence into their country. If there were a renewal, anywhere in the Asia-Pacific Region, of a massacre or expulsion of the ethnic Chinese minority, would China react, protest diplomatically, or even intervene in any way? On the one hand, China is trying to develop improved relations with its Asian neighbors and has reassured them that it will not interfere in their internal affairs. On the other hand, as China's economy continues to grow rapidly and as China's government and military project their great power status beyond the nation's borders, China's government might be unable to ignore blatant attacks on Chinese people overseas.

Anti-Chinese feeling in Indonesia exists despite Indonesia's tolerance of its diverse cultures and faiths. Nearly 90 percent of the population is Muslim, and extremist Islamic groups sometimes target non-Muslims for criticism. Indonesia has recently experienced labor, student, and ethnic unrest attributable to myriad causes, including very low wages.

Sri Lanka is another ethnic flash point. Much of the great progress that Sri Lanka was making before its civil war was negated in fighting between Tamils and Sinhalese. The Sri Lanka case demonstrates how uncertain are predictions of ethnic cooperation or ethnic crisis; this country seemed to be on a path of progressive social, demographic, and economic development until it collapsed into protracted, self-destructive civil war. Relations between the majority Sinhalese and minority Tamil populations remain tense. India could be drawn into the edges of the conflict as before. The election of Prime Minister Chandrika Kumaratunga to the Sri Lankan presidency was a ray of hope that the intensity of this conflict would eventually be reduced,<sup>35</sup> but at this writing it once again threatens security in South Asia. It is another known point of tension where past experience gives us some

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35. Moore, Nov. 11, 1994.

ability to predict its impact and plan how to contain its potential for devastation.

In contrast to many parts of the world, where countries are experiencing near-total breakdown because of ethnic or religious turmoil, the Asia-Pacific Region might be seen as comparatively idyllic. But deep divisions remain in many parts of the APR, and explosions based on religious, tribal, ethnic, or national hatreds are always possible.

# Health and mortality

## Catastrophic mortality—causes and consequences

Until this century, most Asia-Pacific countries and areas had high death rates most of the time, punctuated by periodic catastrophes that raised mortality even higher than was normal. In the twentieth century, all Asian and Pacific countries have attained much lower underlying death rates and correspondingly higher life expectancy. This does not mean that catastrophes no longer happen.

The worst disasters that tend to be sustained the longest are caused by civil wars, international wars, genocidal policies, and ideologically driven misgovernment. Asia has had its share of these catastrophes in recent decades. Examples that readily come to mind are World War II, the Korean and Vietnam wars, China's civil war prior to 1949, the unrest that led to and accompanied the partition of India, 30 million excess deaths in China's Great Leap Forward, a million people slaughtered by the Khmer Rouge in Cambodia, the war in Afghanistan, and civil war in Sri Lanka. Some of these crises, though devastating for the people affected, were contained within one country or area and did not lead to much involvement of international organizations or the governments or militaries of other countries. Others, however, led to involvement of forces from outside the immediate crisis area.

It would be naive to assume that such mortality crises caused by war and policy are a thing of the past in the Asia-Pacific Region. Though many Asia-Pacific countries are making great progress in economic and political development, many of the hatreds and problems that caused past catastrophes are still smoldering and could erupt again. Now that worldwide communication is faster and more pervasive than in decades past, intentional slaughter is harder to hide. Wider knowledge of what is happening as it happens tends to increase pressure for intervention. This could prevent some crises from escalating, but at

the cost of maintaining forces needed for intervention and the possible losses of U.S. personnel as a result of intervention.

Excess deaths in Asia are also caused by earthquakes, volcanoes, floods, typhoons, and other natural disasters. International, U.S., and other organizations usually want to help in such situations and can get drawn in for humanitarian relief. Most of these natural disasters cannot be prevented, but the magnitude of the resulting devastation has been exacerbated by rapid population growth or high population density. For example, Bangladesh is essentially a vast river delta and flood plain. But the devastating flooding that has occurred in Bangladesh in recent decades has been made worse by deforestation in Nepal and other Himalayan areas. In the mountains, ever more people have cut down ever more trees to use for fuel and to clear land for habitation and food production. The denuded mountainsides cannot hold the water from monsoon rains and other storms, so the silt-laden water floods the plains below Nepal, creating more destruction than if mountain forests retained more of the excess water. At the same time, Bangladesh is the most densely populated country in the world, and people have no place to go to avoid the floods. In the "great deluge of 1988," three-fourths of Bangladesh was submerged and a staggering 33 million people were made temporarily homeless.<sup>36</sup> Because there has been so little progress in reforesting Nepal or building flood-control dams and reservoirs, periodic serious flood devastation is likely to recur in Bangladesh.

Bangladesh is doubly vulnerable because of cyclones. In the past 32 years, 16 devastating cyclones have struck the country. In 1991, a cyclone roared off the Bay of Bengal with winds of 110 mph and waves 20 feet tall, killing nearly 140,000 people in southern Bangladesh and leaving 10 million homeless.<sup>37</sup> It is thought that concrete cyclone shelters can provide the critical protection that the flimsy huts of the rural people cannot, but the lack of resources has meant that only a small fraction of the shelters needed in low-lying islands and beaches have been built.<sup>38</sup> A climatologist at Hong Kong University referred

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36. Bhattarai, 1993.

37. Hossain, 1993.

38. *National Geographic*, 1993.

to the impact of cyclones on prospects for Bangladesh as follows: "You don't want to be in a situation like Bangladesh where every time there is a major tropical cyclone the loss to life and property and the demands on the economy are astronomical, so the place never gets off the ground."<sup>39</sup> Because of the frequency of crises caused by natural disasters in recent years, and little change in the underlying factors causing and exacerbating these crises, Bangladesh is a likely candidate for similar future humanitarian relief needs.

Earthquakes are a constant threat in the "rim of fire" around the Pacific. China's major Tangshan earthquake of 1976 killed hundreds of thousands of people, in part because of the location of the epicenter in a big city, which was flattened by the quake. A contributing factor to the devastation of this and similar earthquakes in Asia is the lack of earthquake-resistant houses and city buildings. Areas that are poor and densely populated, a description applicable to most of Asia, have been unable to afford the more costly materials and designs that might give protection from earthquakes in building construction.

## **AIDS epidemic in Asia<sup>40</sup>**

The HIV/AIDS epidemic came later to Asia than to Africa, the United States, Latin America, or Europe. Among Asia-Pacific countries, only isolated ones such as North Korea have shown no evidence of HIV infection to date. Where the epidemic has begun, it is now spreading, rapidly in some countries. The World Health Organization (WHO) estimates that, as of late 1994, 3 million adults were infected with HIV in South and Southeast Asia, more than 50,000 in Northeast Asia and the Pacific, and over 25,000 in Australia.<sup>41</sup>

The U.S. Bureau of the Census gathers the available data on HIV seroprevalence rates in the developing countries of Asia and around the

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39. Griffin, 1993.

40. All data presented here are from the U.S. Bureau of the Census, International Programs Center, HIV/AIDS Surveillance Data Base.

41. WHO, 1995, 3.



world. Statistics are compiled separately for "low-risk" populations, such as pregnant women attending prenatal clinics or hospitals, and "high-risk" populations, such as intravenous (IV) drug users, prostitutes, and patients at sexually transmitted disease (STD) clinics.

Although some studies of low-risk populations in the Asia region have not found evidence of HIV infection (for example, available studies of pregnant women in Taipei, Taiwan; eight cities of Japan; and Bandung, Indonesia, found no HIV-positive individuals), it is not clear how long this will continue to be the case. Some of these data are from the late 1980s, and more recent information might detect the onset of the epidemic. For example, data for small numbers of pregnant women in Burma (Myanmar) showed no HIV-infected individuals in 1989, but a 1-percent seropositive rate in 1990 and a 2-percent rate in 1992. In Madras, India, among small samples of women attending antenatal clinics, no HIV-positive individuals were detected in 1988 and 1989, but in 1990 the HIV seropositive rate was 1 percent. Other low-risk populations in some parts of India are showing rapidly increasing HIV infection. For example, in Tamil Nadu State in southern India, HIV infection levels in the general population doubled from 0.2 percent in 1988 and 1989 to 0.4 percent in 1990, and doubled again to 0.8 percent in 1991.

HIV seroprevalence levels have been rising among pregnant women in all regions of Thailand, to 1 percent in the south and northeast, 2 percent in central Thailand, and 4 percent in the north by June 1994; in several provinces the figure was over 5 percent, and in one northern province, 10.6 percent.<sup>42</sup> Among young military recruits in Thailand as of 1992, HIV-seropositive rates were 2 percent in the central and northeast regions, 4 percent in the south, and 8 percent in the north. These data suggest that an explosive AIDS epidemic has taken hold in Thailand.

IV drug users are showing high rates of infection in some parts of Asia. Data from the China mainland show that most HIV-positive individuals detected so far are IV drug users and their spouses in rural counties of Yunnan Province along the border with Burma; in

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42. Corbin and Ryan, 1994, 11-12.

one county, 80 percent of those tested in this subgroup were HIV-positive by 1992. In Manipur State of northeastern India, HIV prevalence among IV drug users rose from 0 in 1986-88, to 9 percent in 1989, to over 50 percent in 1990 and 1991.

HIV seroprevalence figures for commercial sex workers in Asia vary enormously. No or almost no HIV-positive individuals have been found among female commercial sex workers in the following places: Indonesia; Sichuan Province, mainland China; Taipei, Taiwan; Hong Kong; South Korea; Colombo, Sri Lanka; and Sydney, Australia. The following countries to date have detected positive HIV seroprevalence rates among prostitutes: Malaysia (2 percent in one sample), Philippines (0-1 percent in numerous samples), Japan (1 percent in one Tokyo sample but 0 in most samples), Cambodia (9 percent in a small sample), Burma (4-11 percent in samples after 1989), and, most seriously, India and Thailand.

As shown in figure 8, the proportion of Indian commercial sex workers who tested positive for HIV ranged from 0 in one town to 55 percent in another as of 1990. By 1994, nearly half of Bombay's 60,000 prostitutes were infected with the virus.<sup>43</sup> Figure 9 illustrates that the high-risk populations (prostitutes, STD clinic patients, and IV drug users) located in India's coastal cities and in or near the capital city of New Delhi have HIV-seropositive rates of 1 percent or more. High-risk populations in the center of the country appear relatively unaffected by HIV so far.

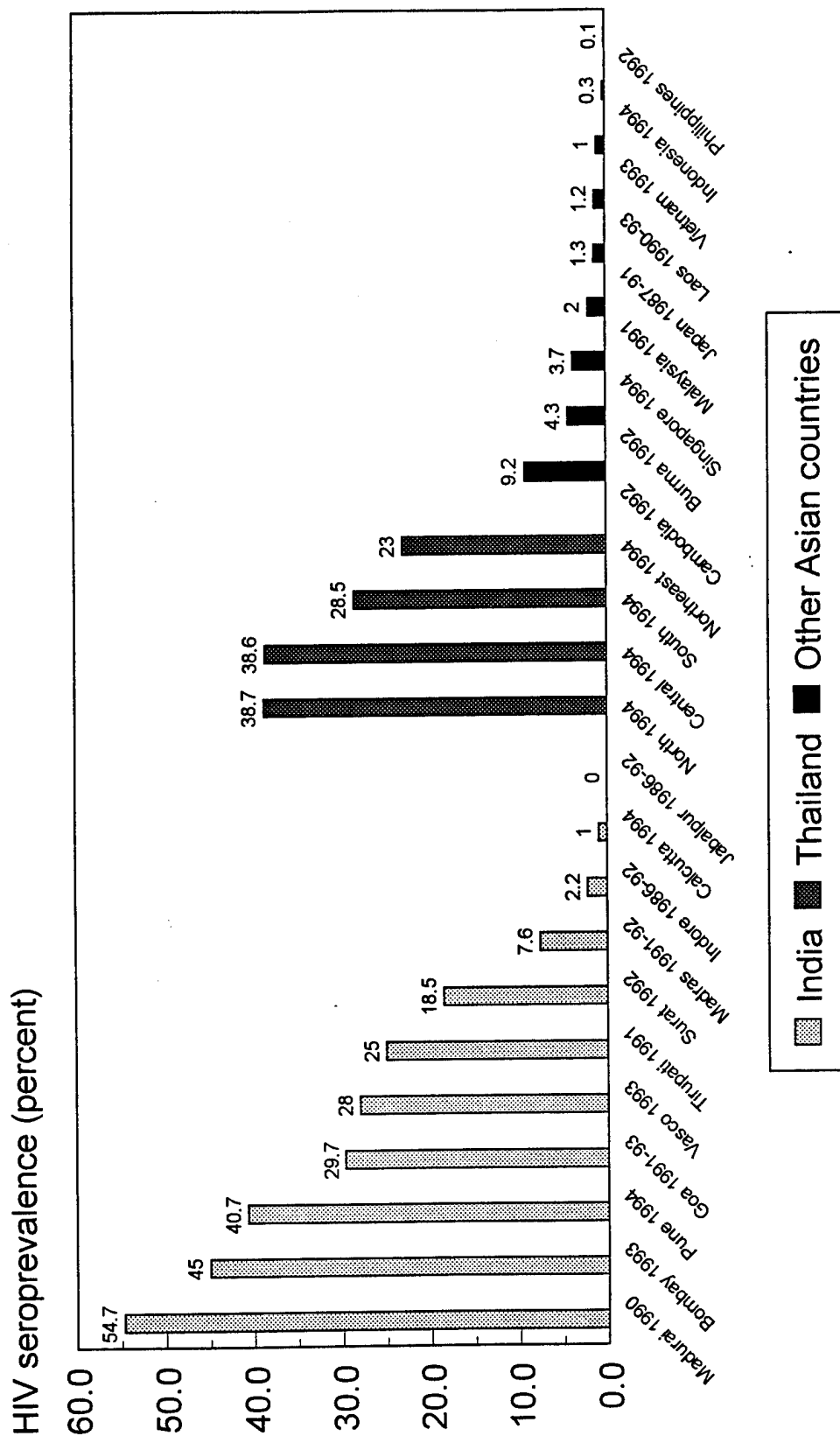
Figure 8 also shows that the four regions of Thailand reported 23-39 percent of commercial sex workers infected with HIV by 1994. Figure 10 shows an upward trend, then some leveling out, in the four regions of Thailand during the early 1990s. High HIV seroprevalence rates are also found among commercial sex workers in both major cities, although the trends are less clear.

As in Africa, the HIV epidemic in Asia is transmitted primarily heterosexually, and through blood transfusions and on mother-to-child transmission at birth. In Asia but not Africa, intravenous drug use is

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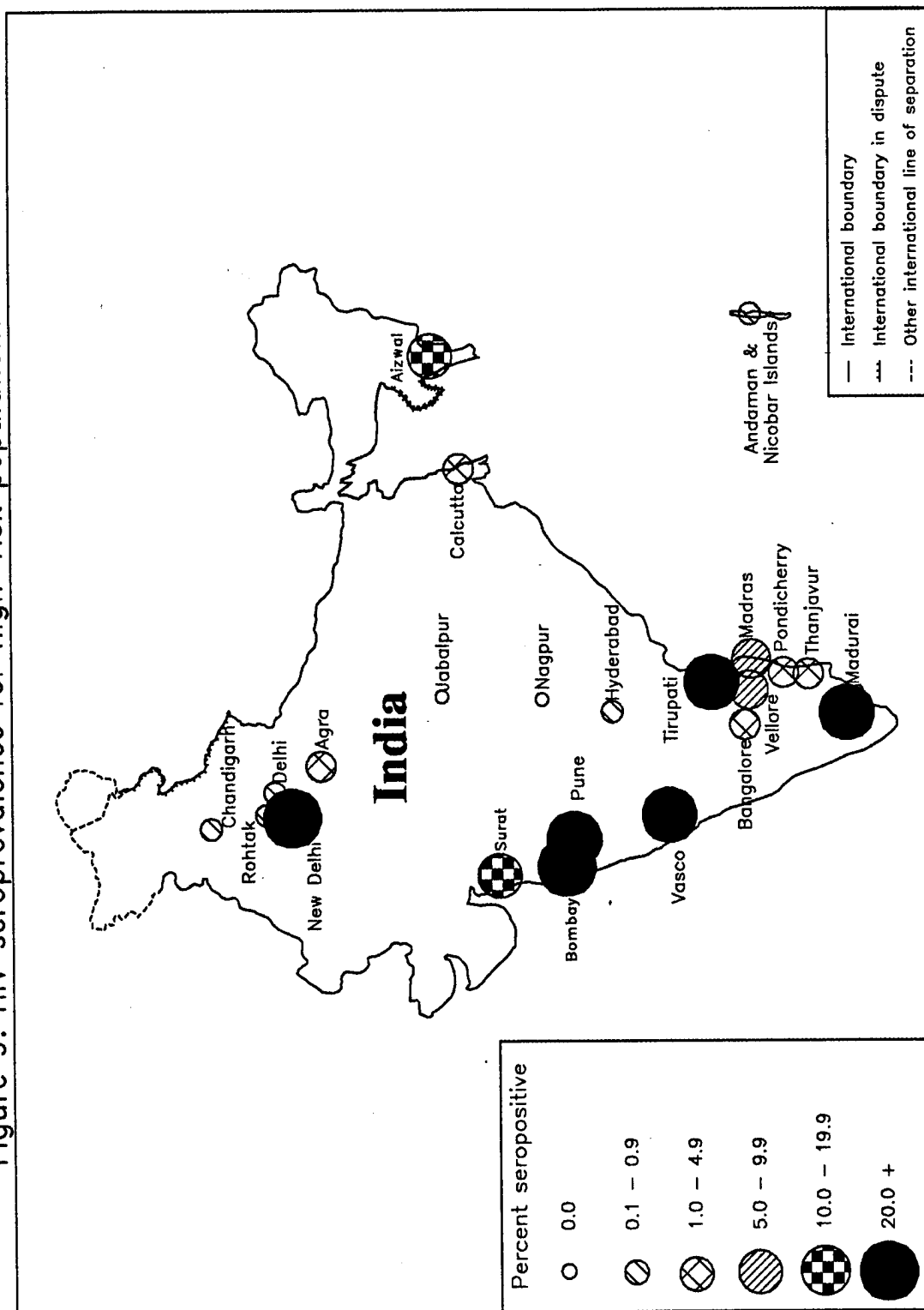
43. *Asiaweek*, Aug. 31, 1994.

# Figure 8. HIV seroprevalence for sex workers in Asia



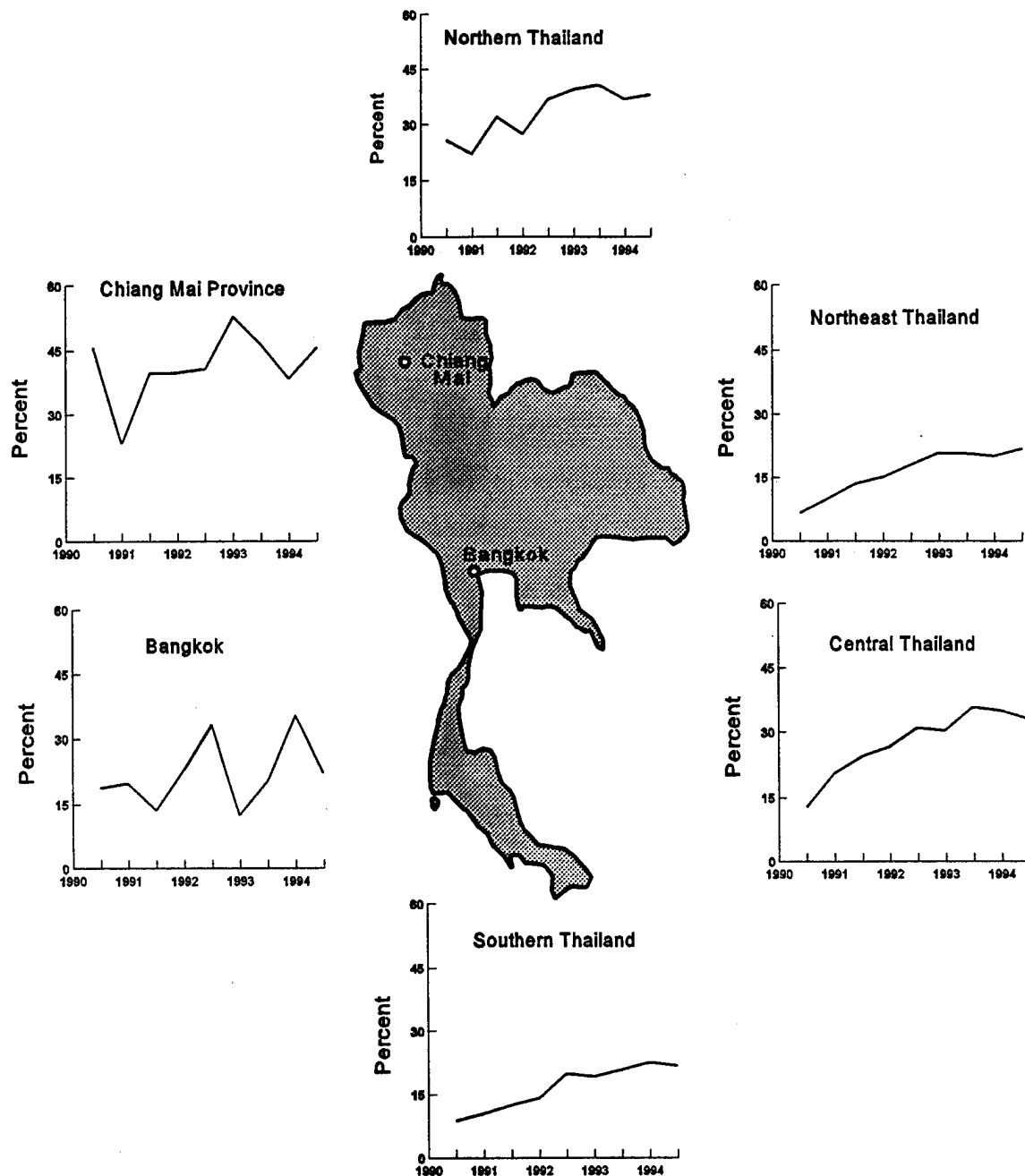
Source: Stanecki and Way, 1996.

Figure 9. HIV seroprevalence for high-risk populations: India



Note: High-risk populations comprise prostitutes, STD clinic patients, and intravenous drug users.  
Source: Stanecki and Way, 1996.

Figure 10. HIV seroprevalence for sex workers in Thailand: 1990 to 1994



Source: Stanecki and Way, 1996.

also a major avenue of HIV transmission. Few data are available on HIV seroprevalence among homosexuals in Asia, though it is reported that Thailand's HIV/AIDS epidemic began in the male homosexual/bisexual population.<sup>44</sup> Male commercial sex workers in Thailand today have lower rates of HIV infection than females.

What is the significance of the available information on the HIV/AIDS epidemic in Asia for Asian security in general and for the U.S. military in particular? Most narrowly, it is obvious that clients of commercial sex workers in Indian and Thai cities and ports are at risk of being infected with HIV. If any military personnel were to engage in unprotected sex with prostitutes in Bangkok or Bombay, for example, they would be in contact with the main source of infection driving the Asian HIV epidemic. Other major cities and port cities in Asia are expected to join the ranks of the Thai and Indian cities with high infection rates among commercial sex workers.

More broadly, the rapid takeoff in the Thai and Indian epidemics is ominous. India has not yet implemented a strong campaign to halt or slow the spread of HIV. It is predictable that the HIV virus will spread from commercial sex workers to their male clients and further to the wives and some children of men who contract HIV from prostitutes. Rapid spread of HIV in the general population may follow in India's core epidemic regions shown in figure 9, and thereafter in other parts of the country. India, poor and populous and poised to begin rapid economic growth, faces reversal of its hard-won gains in health conditions and level of mortality. Devastating economic impacts are projected for families in which any member, but especially an adult couple, is infected with AIDS.

Thailand, in contrast to India, began an aggressive HIV-control program in 1989. Because commercial sex is the main source of heterosexual HIV infection in Thailand, the focus of the program has been to supply free condoms to prostitutes and their clients and mandate condom use during paid sex. Sanctions are severe for brothels where the prostitutes contract new sexually transmitted disease (STD) infections, because this indicates that condoms were not used.<sup>45</sup> This

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44. Rojanapithayakorn, 1994, 9.

45. Hanenberg, et al., 1994, 243-245.

campaign has reportedly been very successful, in that prostitutes now report that condoms are used in 94 percent of all commercial sexual encounters. STD cases in men declined sharply from the late 1980s to at least 1993.

The impact of this program to date has been to slow down what would otherwise have been an even more virulent HIV/AIDS epidemic. As shown in figure 10, slight downturns were detected in the prevalence of HIV among prostitutes in Bangkok in 1993 then 1994, and in Chiang Mai in 1993. If very widespread use of condoms among prostitutes is accurate and can be sustained, gradually the numbers of new infections among men should decline, and the spread of HIV to the general population should slow down. The following report details the hopeful side of the fight against HIV/AIDS in Thailand:

**The Thai response.** The one Asian country that has mounted a major response to the epidemic is Thailand, building on a nationwide program of public education, condom promotion, and improved STD treatment. Every government ministry has prepared an AIDS plan under the guidance of a five-year National AIDS Prevention and Control Plan. A system of AIDS “peer educators” has been implemented in schools nationwide. Mass media and public education efforts have seen to it that almost every Thai knows of the AIDS problem and how to protect himself or herself....Thus, every sector of society is becoming involved in the battle. As a result, the incidence of new HIV infections in 21-year-old males has been cut in half over the past three years, and other STD rates have fallen.<sup>46</sup>

In spite of these positive signs, the momentum of the HIV/AIDS epidemic in Thailand remains great. Prevalence of HIV among “direct” commercial sex workers—those working in brothels—has flattened out in 1993 and 1994 at high levels (20-40 percent) in all regions of the country.<sup>47</sup> Many of those already infected in Thailand are still infecting others. In 1994, the prevalence of HIV among pregnant

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46. Brown and Xenos, 1994, 11.

47. Corbin and Ryan, 1994, 8.

women stabilized in the south and northeast, but continued to rise sharply in the central and north regions. Despite the extensive efforts to control the AIDS epidemic in Thailand, infection rates continue to increase, especially among the sexually active population in rural areas.<sup>48</sup>

By the 1990s, Thailand had achieved low mortality and fertility, and its economy had been growing rapidly for decades. But the AIDS epidemic will derail some of these promising trends. Projections of the AIDS epidemic in Thailand vary widely, depending on assumptions about the degree of success of control efforts and many other variables. One projection created at the U.S. Bureau of the Census shows that Thailand's population would still be growing at 0.9 percent a year in the year 2010 without the AIDS epidemic, but after incorporating AIDS mortality, the population may be declining at that time, with a negative growth rate estimated at minus 0.8 percent annually.<sup>49</sup> If this somewhat grim scenario comes to pass, Thailand's crude death rate would be over 20 deaths per thousand population per year by 2010, instead of 6 without AIDS, and the infant mortality rate would have risen to about 50 infant deaths per thousand live births, rather than below 20 in the non-AIDS situation. Child mortality at ages 0-4 may be several times as great with AIDS as it would be without. Life expectancy could decline drastically from its current high level. If, however, HIV-control efforts work comparatively well, this devastating scenario could be greatly modulated.

Even under the best assumptions, Thailand faces a severe AIDS epidemic in the next decade and a half, as those who are currently HIV-positive get ill with AIDS. The epidemic will be very costly in terms of direct health costs and lost productivity of adult workers and their caretakers. The impact on affected households is reported to be staggering, including vast increases in health care costs, slashed consumption levels, severe income loss, steep reduction in family food production, orphaned children, loss of care for the elderly, reduced education for children, and, often, family disintegration.<sup>50</sup>

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48. Rojanapithayakorn, 1994, 12.

49. Stanecki and Way, 1994, 20.

50. Pitayanon, Janjareon, and Kongsin, 1995, 14-15.



Other Asian countries are also vulnerable in the near future. Countries particularly at risk are those with a tradition of premarital or extramarital sexual experience, countries where prostitution is widespread, countries where condom use is low or negligible, and countries with rampant intravenous drug use. The prognosis in parts of South and Southeast Asia is poor. The pattern of the Asian AIDS epidemic reportedly has been for HIV to spread more quickly than it did in the United States or Africa, resulting in widespread HIV infection before people begin getting sick from AIDS.<sup>51</sup> This promotes official and popular denial that there is a problem. The epicenter of the explosive AIDS epidemic is now in Thailand, Burma (Myanmar), India, and Cambodia (see figure 11). In Burma, infection rates found in tests of intravenous drug users (nearly 80 percent HIV-positive) are the highest recorded anywhere. Burma is hampered in slowing its HIV/AIDS epidemic by poverty, denial of the seriousness of the problem by some leading officials, shortages of condoms and HIV testing capability, and the return of Burmese prostitutes infected with HIV in Thailand.<sup>52</sup>

Other countries in the region of the core HIV area have the potential for rapid increase in HIV infection (see figure 11) because of high-risk behaviors in the general population. A military official in the Philippines put AIDS at the top of his list of non-military threats not only to his country but to all member countries of the Association of Southeast Asian Nations (ASEAN):

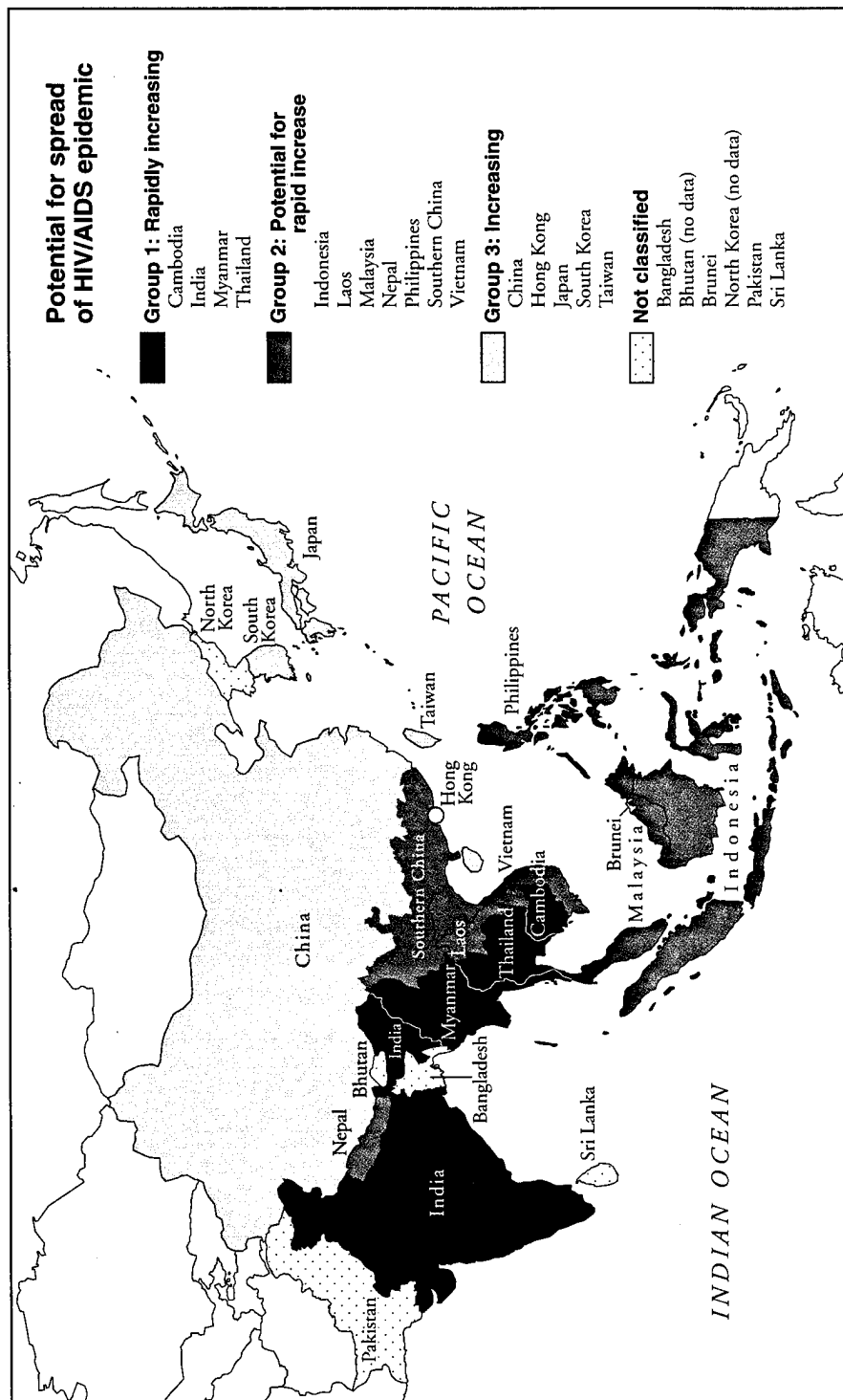
"The rapid spread of the AIDS epidemic has become one of the major threats confronting member countries of ASEAN," a senior army official said here today. Brig. Gen. Raul Urgelio, Armed Forces Deputy Chief of Staff for Intelligence, said the threats facing ASEAN now transcend military dimensions and include the dreaded AIDS disease. He noted that the quickening pace of AIDS spread in the Philippines and Thailand has now become a serious non-military threat to the rest of the ASEAN region.... ASEAN groups Brunei, Indonesia, Malaysia, Singapore, Thailand,

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51. Brown and Xenos, 1994, 1-15.

52. Shenon, 1994.

Figure 11. Potential for spread of HIV/AIDS epidemic



Reproduced with permission of Brown and Xenos, 1994.

and the Philippines. According to Urgelio, the other non-military threats to ASEAN include drug trafficking, uncontrolled population growth, aging population, urbanization, pollution, increasing demands for and pressure on natural resources, and environmental degradation.<sup>53</sup>

Indonesia has begun a program of AIDS prevention. In Bali, a leading doctor has set up a foundation to supply condoms to high-risk male and female sex workers in the tourist industry. Programs based on her model have been expanded to more than 30 other communities in Indonesia where there are other groups at elevated risk of HIV infection such as sailors, truckers, and oil industry workers. HIV infection is still low, but increasing rapidly in Indonesia.<sup>54</sup>

There will be economic and social shocks from the AIDS epidemic in the core HIV countries and others where the epidemic takes hold.<sup>55</sup> Health care costs will escalate. AIDS deaths occur most often in the 30 to 45 age range, crippling and killing potentially highly productive people and multiplying the normally low death rates in these ages. Resultant labor shortages may slow economic development. Economic damage could follow any declines in tourism or foreign investment triggered by the AIDS epidemic. Family care of the elderly and children may suffer when young adults die of AIDS.

## Other public health trends

It is believed, though not yet proven, that infection by certain sexually transmitted diseases (STDs) could increase susceptibility to or infectivity of HIV infection. Such a relationship is particularly suspected in the case of those STDs involving genital ulceration such as genital herpes, syphilis, and chancroid.<sup>56</sup> Available data are poor on the prevalence of various STDs in Asia. Many individuals who contract STDs go untreated. The attempt to block or slow down an AIDS epidemic in Asian countries needs to focus on prevention and cure of STDs as

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53. Xinhua News Agency, 1993.

54. Stevens, 1995, A3.

55. Brown and Xenos, 1994, 12.

56. Mertens, Hayes, and Smith, 1990.

well; this association is a prominent characteristic of the Thai AIDS prevention program.

An alarming trend in Asia (and worldwide) is the evolution of strains of disease that are resistant to antibiotics or to the treatments of choice for the illness. For example, in Southeast Asian countries, the malaria parasite has become resistant to most drugs commonly used to treat the disease, so malaria is worsening in many countries of Asia.<sup>57</sup>

The recent outbreak of bubonic and pneumonic plague in India is a small example of the possible impact of epidemics in the Asia-Pacific Region. In a two-month period, India reported a total of 693 plague cases, most of them in Maharashtra but also small numbers of cases in four other provinces and the New Delhi district; infected persons had left the core infected area and spread the disease to other provinces.<sup>58</sup> The plague-induced migration could have spread the epidemic farther within India, and international reaction, including cancellation of flights and examination of passengers arriving from India, indicate the possible worldwide effects of such epidemics.<sup>59</sup> Vigilance is needed to head off the spread of such plagues, including rapid international coordination to treat and quarantine the sick in affected locations.

A grave danger to health and safety where there has been extended civil or international warfare is land mines. For example, as Cambodian refugees return home, they are at constant risk. Because of mine explosions, Cambodia has the highest proportion of amputees to national population in the world.<sup>60</sup> It is estimated that there are between four and ten million mines in Cambodia.<sup>61</sup> If the higher estimate is correct, there are almost as many mines as Cambodians. To

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57. Naughton, 1994.

58. WHO, Oct. 19, 1994.

59. U.S. CDC, Sept. 30, 1994; U.S. CDC, Nov. 11, 1994.

60. UNDP, Sept. 26, 1994.

61. UNHCR, 1993, 111, 116.

de-mine countries like Cambodia is expensive, slow, and incomplete, so that their populations are continually at risk of death or maiming from mines. The Cambodian Mine Action Centre in Phnom Penh, funded by nine developed countries including the United States, has so far cleared mines from nearly 8.5 million square meters of land, removing (detonating) 22,000 anti-personnel mines and over 130 anti-tank mines. The Centre's survey teams have marked over 44 million square meters of minefields throughout the country.<sup>62</sup> Military expertise may be relevant in clearing land mines today and in trying to head off the use of land mines in future conflicts.

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62. UNDP, Sept. 26, 1994.

# International migration

## Asian international migration—numbers and characteristics

During the past several decades, the predominant pattern of recorded international migration from Asian countries was to the United States, Canada, Australia, and New Zealand for settlement, and to the oil-rich countries of the Middle East under labor contracts. In the decades from the 1960s to the present, emigrants from Asia have constituted an ever-greater share of legal immigration to the countries of permanent immigration. By the late 1980s, 41 percent of legal immigrants to Australia, 48 percent of legal immigrants to Canada, and 44 percent of legal immigrants to the United States were from Asia. In all three of these countries, Asian-born immigrants accounted for the highest proportion of immigrant admissions in 1985-89.<sup>63</sup> In this 5-year period, the United States admitted 1.34 million Asians, Canada admitted 332,000, and Australia admitted 255,000, for a total of 1.92 million legal Asian immigrants. Settler migrants from Asia to North America and Australia, most legal but some illegal, originate primarily in China, India, the Philippines, South Korea, and Hong Kong.

Contract labor migration has been the other major component of Asian international migration. As shown in table 13, each year in the late 1980s, an average of 1.11 million Asian workers left their country to work under contract in another country; the numbers increased slightly to 1.15 million a year in 1990-91. Most of these workers have gone to the Middle East. During most years of the 1980s and the beginning of the 1990s, there were about 1 million recorded labor migrants from Asia to the Middle East annually. These figures are gross flows, that is, they represent the emigration of workers without recognizing their return. However, most of the work contracts are for

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63. UN, 1994, 383-384.

a defined period, after which the workers are required to leave their host country. Guest workers in the Middle East get accustomed to earning comparatively high wages, including enough money to provide remittances to their families back home. When they are required to return to their native country, they may be discontented with the lower wage levels found there. Many were sent home during an economic slowdown in the Middle East in the mid 1980s, and over 400,000 Asians left Iraq and Kuwait in August-September 1990 as a result of the Gulf War.<sup>64</sup>

As shown in table 13, the Philippines is by far the leading Asian source of recorded international labor migrants, followed at a distance by India, Pakistan, South Korea, Bangladesh, Thailand, and Indonesia. During the 1980s, the number of male Asian migrants to the Middle East declined, and the number of female migrants increased. Many large construction projects undertaken by oil-rich countries of the Middle East were completed in the early 1980s, so that work opportunities for unskilled and semi-skilled construction workers, many of whom had been recruited in India and Pakistan, became scarce. At the same time, the demand for female labor in the service sector in Middle Eastern countries, mostly as domestic servants, increased. In India and Pakistan, cultural and legal factors inhibited the large-scale recruitment of women to work abroad. Women from Indonesia, the Philippines, Sri Lanka, and Thailand have met this demand for labor.<sup>65</sup> By the late 1980s, over one-quarter of Asian workers recruited for the Middle East were women.<sup>66</sup>

Though most Asian migrant laborers still go to the Middle East, a shift in the pattern of destinations has emerged during the past decade. In the early 1980s, 5 percent of contract labor migrants declared destinations in other Asian countries; this rose to 11 percent in 1985-89. In addition, the proportion of Asian contract workers employed as seamen on foreign vessels increased from 9 percent in 1980-84 to 12

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64. UN, 1994, 400.

65. UN, 1994, 402.

66. Skeldon, 1992, 40.

percent in 1985-89; they came mostly from the Philippines and South Korea.<sup>67</sup>

The new Asian destinations for migrant workers are Japan, Taiwan, Hong Kong, and South Korea in East Asia, as well as Singapore, Malaysia, and Brunei in Southeast Asia. Some of these booming economies of Asia are experiencing labor shortages and rising wages among their own populations.<sup>68</sup> Businesses in these countries want to hire cheaper labor from abroad. But in general, Asian governments are wary of allowing much immigration, even that categorized as temporary, for fear that the influx will become permanent. Where some temporary worker migration is legal, the categories allowed are narrowly defined.

In Pacific Asia, three streams of non-refugee flows of labor migrants have expanded rapidly since the mid 1980s.<sup>69</sup> The fastest-growing is between developing countries of Southeast and South Asia and those in industrialized East Asia. This involves the northward flow of unskilled workers mainly to Hong Kong, Taiwan, and Japan (increasingly organized by recruitment agencies), and the flow of skilled and professional workers in the opposite direction. The second stream is within Southeast Asia. Singapore has a sizable pool of legal foreign workers that make up 17 percent of its labor force, but most other labor movement from one Southeast Asian country to another is illegal. The third stream of labor migrants is within Northeast Asia, including illegal migration of unskilled workers from China, and the flow into China of professional, managerial, and technical workers from Hong Kong and Taiwan.

In sum, the intra-Asian pattern of international worker migration is dominated by the legal and illegal movement of unskilled and semi-skilled workers from less-developed to more-developed countries. There is a counterflow of professionals and business people moving

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67. UN, 1994, 402.

68. See Heginbotham, 1996, for further detail on labor shortages in dynamic East Asian economies.

69. Fong, 1994, 250, 253.



from the more economically developed countries of Asia to the less-developed, accompanying investment capital and taking advantage of business opportunities and cheap labor.

In Asia as elsewhere, distinctions between legal and illegal migration are blurred. For example, migrants from throughout Asia may enter Japan legally as students or tourists, then work at jobs not allowed by their visa or overstay the visa for employment purposes. Similarly, refugees and asylum-seekers may have legitimately fled war or persecution, or may simply be economic migrants attempting to claim refugee status. After discussion of refugee flows, we will focus on the problem of illegal international migration from and within Asia.

## Refugees

In recent decades, Asian countries have generated enormous numbers of refugees, millions of whom have been resettled in other parts of the world, but many of whom remain as refugees in Asian countries of asylum, and hundreds of thousands of whom have returned to their home countries. The United States accepts more refugees annually for permanent resettlement than any other receiving country. In the 1970s, a large proportion of refugees admitted to the United States were from Vietnam, Laos, and Cambodia. In 1980-81, fully 80 percent of the 362,000 refugees approved for permanent settlement in the United States were from East and Southeast Asia (mostly Vietnam). During the 9-year period 1982 through 1990, 55 percent of the 662,000 refugees approved for admission to the United States were from countries of East and Southeast Asia.<sup>70</sup>

Beginning in 1989, the United States has accepted more Vietnamese each year through the Orderly Departure Program direct from Vietnam, and fewer boat people from refugee camps. Canada and Australia, the other countries of permanent settlement, have followed the same pattern. Therefore, far fewer Vietnamese fled by sea in 1990 and 1991 than in 1989.<sup>71</sup> By the end of 1991, the exodus of boat people

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70. UN, 1994, 51.

71. UN, 1994, 29.

had virtually ceased. Only 58 boat people arrived in countries of first asylum in the whole of 1992, and 75 during the first 5 months of 1993.<sup>72</sup> Would-be emigrants knew that their chances of permanent resettlement in a developed country from a refugee camp were much diminished. But at the same time, the United States opposed the forced repatriation of Vietnamese boat people to Vietnam, so the numbers remaining in refugee camps declined only slowly. As shown in table 14, as of year-end 1992, large numbers of Vietnamese refugees were still in China and Hong Kong, and smaller numbers in Indonesia, Japan, Malaysia, the Philippines, and Thailand. The numbers diminished in 1993 and 1994, as shown in the table. Caution is required, however, in citing Vietnamese refugee data from the most recent years. The sudden drops or increases in Vietnamese "refugees" in several countries may be due to reclassification of Vietnamese residents from one category to another. For example, by the end of 1993, Thailand reported only 1,700 Vietnamese "refugees," but also living in Thailand were 1,000 "screened out" Vietnamese and 7,100 Vietnamese "awaiting decision," for a total of 9,800.<sup>73</sup>

Except for the several hundred thousand refugees from Vietnam who have resettled in China, the Vietnamese in Asia-Pacific refugee camps have now been screened, and 90 percent are categorized as economic migrants rather than refugees from persecution. The host countries want to close the refugee camps as soon as feasible and return the economic migrants to Vietnam.

Numerous Asian international migrants are being repatriated to their countries of origin. During 1994, for example, 6,940 Vietnamese were repatriated to Vietnam from Indonesia, the Philippines, Thailand, Malaysia, and Hong Kong. Laos received back 6,190 Laotians from Thailand.<sup>74</sup>

The Cambodian refugee problem has been mostly solved. The 370,000 Cambodians in camps along the Thai border in late 1991

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72. UNHCR, 1993, 27.

73. UNHCR, 1994, tables 3 and 19.

74. UNHCR, 1995, tables 10a and 10b.

were repatriated to Cambodia in 1992-93 to take part in elections for a new government. The UN High Commission for Refugees (UNHCR) closed its operations in Thailand in April 1993,<sup>75</sup> but continues to assist some repatriated refugees in Cambodia.

Refugee figures in table 14 give us hints about where refugee problems remain and where refugee crises might be building. The Afghan refugee problem, for instance, has been spilling over into India in the past few years, as seen in the table.

Though Vietnam is beginning to open up its economy to market forces and foreign investment, the country remains very poor and government human rights violations continue. Surges of attempted emigration from Vietnam could happen again. The Khmer Rouge in Cambodia continues to threaten civil war and disruption, which could generate whole new waves of Cambodian refugees. During 1994, there was a surge of 40,000 refugees flowing from Cambodia to Vietnam. These are Cambodians of ethnic Vietnamese origin who were being systematically attacked in Cambodia.

The Sri Lankan civil war escalated in the 1980s and early 1990s, generating Tamil refugees who fled to the Tamil-populated regions of southern India, as shown in table 14. Tamils in refugee camps in south India began returning to Sri Lanka in 1992. The current and any future warfare between Tamil separatists and the Sinhalese majority could readily cause the flight of new refugees.

Burma (Myanmar) and Bangladesh generated new refugee flows in 1991-1993 to nearby countries. This should alert observers to the potential for further instability in each of those countries, which could cause more refugee flight. The quarter of a million refugees who suddenly fled Burma in 1992 are Muslims persecuted by the authorities and the military who see Burma as a Buddhist country.<sup>76</sup> By late 1994, 60,000 of the Burmese Muslim refugees had returned to Burma under international pressure to repatriate,<sup>77</sup> but well over

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75. Reuters Library Report, Apr. 30, 1993.

76. UNHCR, 1993, 83, 135.

77. Coughlin, 1994, 14.

100,000 remained in refugee camps in Bangladesh (table 14). The Burmese military and government have also clashed with guerrillas of the Mon ethnic minority, who are seeking autonomy; 6,000 Mons fled to Thailand in July 1994, but many were forced back into Burma in August and September 1994 by Thai forces. Most of the 82,000 Burmese refugees in Thailand are ethnic minority people who fled fighting between guerrillas and government forces.<sup>78</sup>

The most recent refugee flows are coming from countries like Burma, whose military periodically attacks groups who are not both Buddhist and Burmese-speaking—Muslims, Christians, and tribal groups. Future refugee flows could be generated by fighting in Sri Lanka or elsewhere, religious or ethnic conflict in one or several countries, or escalating oppression in any of the authoritarian countries of the region.

## Illegal Asian international migration

The distance between Asia and North America makes illegal entrance to the United States difficult for Asians. Most illegal residents of the United States are from Latin American countries. But smuggling of Asian, especially Chinese, migrants by boat and air into the United States has escalated in recent years, often via other countries such as Russia or Eastern European countries. They enter the United States without a visa or with forged documents. Most then apply for political asylum. More than 14,300 Chinese nationals applied for political asylum in the United States in 1993, four times the number in 1992.<sup>79</sup>

In the Asia-to-Asia worker migration streams, large numbers of migrants are illegal. There is strong resistance in the developed and newly industrialized countries of Asia to importing large numbers of laborers to meet their demand for workers. Japan is trying to maintain its homogeneity by blocking most immigration—Japan's New Immigration Law still bans the importation of unskilled labor "to prevent any influence upon the domestic labor market."<sup>80</sup> Many

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78. Birsal, 1994.

79. Suro, 1994, A1, A15.

80. Skeldon, 1992, 48.

migrants enter Japan as students or tourists and overstay their visas. There are an estimated 100,000 to 300,000 illegal workers in Japan, many of the women in sex-related occupations and many of the men in construction or other physically demanding industrial jobs.<sup>81</sup>

Taiwan, Hong Kong, and Malaysia have also resisted allowing large numbers of migrants to enter legally. Illegal migrant workers from China are going to Taiwan and South Korea for unskilled jobs. Malaysia's acute rural labor shortages are met partly through illegal immigrants from Indonesia, thought to number at least half a million, primarily men who circulate regularly back to their homes.<sup>82</sup> Another estimate of the total number of unregistered foreign workers in Malaysia is one million, or 14 percent of Malaysia's labor force. Mostly from Indonesia and the Philippines, they work mainly in agriculture and construction.<sup>83</sup>

Driving the international worker flows are not only "pull" factors from the labor-short economies but also "push" factors from the labor-surplus areas. The Philippines, for example, had an official unemployment rate estimated at 15 percent as of April 1991, which meant that 4 million of the total labor force of 28 million were out of work. Another 7 million were estimated to be "underemployed" at highly irregular or part-time work. Jobs are scarce and pay is low; the number of workers who have gone abroad to seek a better situation is conservatively estimated at 2 million.<sup>84</sup> One study of Filipino workers abroad said that there are more Filipinos working illegally than those legally recruited and hired in most of the countries of the East and Southeast Asian region.<sup>85</sup>

Another type of illegal international migration flow in Asia may be considered density-driven.<sup>86</sup> An example is the migration of

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81. Center for Migration Studies, 1992, 758.

82. Skeldon, 1992, 45.

83. Fong, 1994.

84. Ofreneo and Pineda-Ofreneo, 1991, 2.

85. Agnote, 1994.

86. Huguet, 1992, 257.

Bangladeshis from densely crowded Bangladesh to the less densely populated Assam region of India. Another is the migration of Indians into less densely populated Nepal just across the border. These are primarily rural-to-rural migrants looking for land, but the potential for clashes between immigrants and natives is great.

## **Impact of migration on sending and receiving countries**

Economic literature characterizes migration as a rational economic choice to move from where wages are low and economic opportunity is poor to where earnings and opportunities are greater. For the economic migrants, then, the move is generally voluntary, meaning they make the decision to move because it is perceived beneficial to them. Economic migrants—legal or illegal—from Asian countries expect to improve their lives and usually do.

The sending countries of Asia are generally eager to export their workers. The laborers are more fully employed and better paid than they would be at home; they are less discontented; and their remittances in kind and in foreign exchange are massive in aggregate.

When someone who is unskilled and unemployed finds work abroad—for example, some South Asian construction workers in the Middle East—this helps alleviate unemployment in the home country. But most of the contract labor migrants from East and Southeast Asia who go to the Middle East have some kind of skill and were employed before they migrated. The fact that they are hired abroad does not necessarily alleviate unemployment and underemployment among the unskilled in their home country.<sup>87</sup> But the comparatively high income they can earn abroad benefits both them and, through remittances, their relatives and their country's financial flows. Since the early 1970s, the Philippines in particular has relied on worker remittances as a major source of foreign income and foreign exchange. The migration of unskilled workers from the Philippines, Indonesia, and Thailand to other Asian countries also relieves pressures for jobs at home.<sup>88</sup>

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87. Skeldon, 1992, 38.

88. Fong, 1994.

Labor migration has benefits for the receiving country where there is a labor shortage or an unmet demand for certain kinds of workers. After all, the receiving country did not have to raise, feed, or educate that worker from birth. The hiring country gets an already grown worker to contribute to production or services. Labor migrants also can reduce inflationary pressures. Japan imports laborers for undesirable jobs and pays them low wages by Japanese standards.

So in some ways, labor migration within Asia and from Asia is actually beneficial for all concerned. But there are downsides too. The clash of cultures, customs, and religions between native and foreigner can be deeply disturbing, and can lead to anti-foreigner backlash in the receiving country. Also, in many receiving countries, native workers oppose the import of foreign workers because this can depress wages.<sup>89</sup> The flow of unskilled foreign workers into Japan, South Korea, Taiwan, Hong Kong, Singapore, and Malaysia has been visible and dramatic because these workers are concentrated in a few industries, occupations, and areas of the country in low-paying jobs shunned by locals. Foreign workers have become a subject of controversy in all these receiving countries, none of which has a policy of offering permanent residence to unskilled immigrant workers.<sup>90</sup> Gradually, however, some of these countries with labor shortages in less-skilled jobs are changing their policies to legalize contract workers for defined periods of time while encouraging or pressuring employers to upgrade their operations and curb their demand for imported labor. All the labor-receiving areas of Asia are trying to minimize a rising and potentially addictive dependence on foreign workers. The social costs are seen as too great.

The regularization of the labor contract arrangements may help minimize current problems with abuse and exploitation of migrant workers from less-developed economies. Sending countries and international organizations have been pressuring the receiving

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89. Center for Migration Studies, 1992, 768-770; ILO, 1992b, 227-231.

90. Fong, 1994, 253-254.

countries to introduce and enforce legislation to protect the foreign workers.

Labor migration has the potential to facilitate the spread of diseases such as malaria, cholera, and AIDS. Unaccompanied male migrants may employ prostitutes, and female migrants may themselves be involved in prostitution, thus potentially spreading sexually transmitted diseases.<sup>91</sup> In the Philippines, there is concern that returning overseas contract workers might have been infected abroad with HIV.<sup>92</sup> The spread of HIV infection in Burma is being facilitated by Thailand's massive recruitment of young Burmese girls for prostitution in Thailand; if the girls become infected with HIV and become ill, they reportedly are pushed back across the border into Burma.<sup>93</sup> Japanese recruitment of female entertainers, one of the few categories of legal contract workers in Japan, brings young Filipino and Thai women to Japan for sex-related occupations, one way to spread HIV from Thailand.

Though labor migration is controversial, it has clear advantages that help offset perceived disadvantages. However, the effects of refugees and family-reunification migrants are not obviously beneficial to the receiving country. Refugees and asylum-seekers may arrive penniless, may be traumatized, may be a scourge on the landscape in refugee camps, may be illiterate, may be sick. On the other hand, they are often so grateful to have survived that they give their all to the country that gave them sanctuary. Family-reunification migrants are often dependents, may be uneducated and unskilled, and may require schooling and financial support. Therefore, in countries that receive refugees or family migrants, controversy may erupt over the wisdom of allowing the immigrants to stay or allowing more to come.

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91. Huguet, 1992, 270.

92. UPI, Dec. 8, 1993.

93. Shenon, 1994.



## Future international migration

In Asia and worldwide, increasing international migration is being driven by cheaper travel, faster and more pervasive communications, the lure of richer countries near and far, continuing poverty and underemployment at home, and, sometimes, life-threatening oppression that drives refugees from their home countries.

Most observers predict that international migrant flows can only increase in Asia, with rapid expansion expected in the next decade or two.<sup>94</sup> Some note that Japan, South Korea, and Taiwan have located factories overseas as a way to avoid recruiting migrant workers at home, but that they are reaching the limits of what jobs and tasks can be exported. Thus, they must import more workers. Further institutionalization of international labor migration is also predicted, based on the successes of existing job-placement firms. There will be ever-greater pressure from the migrants and from sending countries to allow spouses to join the workers and to allow more long-term or permanent settlement. There may be more of the cultural clashes so dreaded by the countries receiving immigrants.

Meanwhile, the labor-surplus countries have a labor supply that is, in effect, limitless in comparison to the needs of the labor-importing countries during the next couple of decades. The drive to emigrate will continue to be strong in China, with hundreds of millions of surplus laborers who need employment. India, Bangladesh, Vietnam, Indonesia, and the Philippines also could supply vast numbers of willing workers.

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94. Huguet, 1992, 264.

## Population growth, food production, and economic growth

The population growth rate in the Asia-Pacific Region had already declined to 1.7 percent a year by the early 1980s, and declined further to 1.4 percent annually during 1990-95, which is moderate for a primarily developing region. Even with low and declining fertility, the population is expected to continue to grow for decades, partly because fertility is still above replacement level, and partly because of age structure.

So far, have Asia's countries been able to feed their growing populations? Table 15 sums up experience of the 1979-1992 period where data are available. In some countries with no data, food production has not kept up with population growth. Where information is reported, experience is mixed. Bangladesh has low per capita income and saw modest growth in agriculture that trailed population growth. Burma, Sri Lanka, and the Philippines lost ground badly in the 1979-1992 period. Some wealthy countries also experienced declining food production per capita as they shifted toward depending more on the world market for their food supplies, which they could afford.

APR countries whose food production kept up with population growth were Hong Kong, South Korea, India, Malaysia, Thailand, Indonesia, and the China mainland. But this is just part of keeping up with food demand, which is driven not only by population growth but also by economic growth.

Demand for food in Asia is ever-increasing because of population growth. In addition, rapid economic development is fueling higher food demand. As shown in table 15, the gross domestic product (GDP) of most Asian economies grew at the astonishing rates of between 4 and 9 percent a year during the 1980-1992 period. Some of

these economies had already been growing at similarly rapid rates during the prior decade, as seen in the table.

The China mainland is a good example of what happens to food demand when such fast economic growth rates take hold. By the 1970s, after decades of rapid population growth, China's food production system was stretched thin. The diet was heavily dominated by grains with some vegetables. The population had experienced declines since the 1950s in per capita intake of soybeans, an essential protein source where meat, poultry, dairy, and fish-protein sources were so scarce. Oilseeds for cooking were in short supply. The diet was marginal in protein and fats. There was little food variety to provide needed nutrients. But the economic reforms initiated in 1978 produced a doubling of real per capita income in one decade in both rural and urban areas. Demand for meat, poultry, eggs, fish, legumes, fruits, vegetables, oilseeds, dairy products, nuts, and other quality foods and delicacies shot up. Fortunately, in the short run, so did food production, because of agricultural reforms and newly built fertilizer factories coming on line.

Continuation of rapid economic growth in China and other Asian countries will fuel this explosion in demand for greater quantity and quality of food. Can domestic production and world production keep up?

# Food and water supply

## Agricultural products

Predictions of the dire consequences resulting from population growth outstripping food production go back centuries (e.g., Malthus). Recently, Lester Brown and Hal Kane of the Worldwatch Institute have raised this specter again.<sup>95</sup> Their analysis points out that, although total grain production in the world has been increasing fairly steadily for most of the past four decades, per capita production has declined in recent years.<sup>96</sup> Figure 12 shows that the growth rate of global per capita grain production rose to a peak of 1 percent per year in the 1980-85 period and has been reversed during the 1985-91 period, representing a lowering of per capita production during the latest period. Brown and Kane interpret this decline as an indication that the world is reaching the limits of food production.

Some observers argue that the pessimistic Brown and Kane projections and resulting conclusions are unwarranted. They note that the world figures are distorted to some extent by recent trends in developed countries such as the United States, where more land is being left fallow or switched out of grain due to low world grain prices and government subsidies.<sup>97</sup>

If these observers are right, market forces will kick in as demand for grain rises, ensuring a growing supply. On the other hand, poorer countries may be unable to pay higher prices for grain. In this case, the problem would not be our limited world capacity to produce, but the inability of some countries to increase domestic production or to

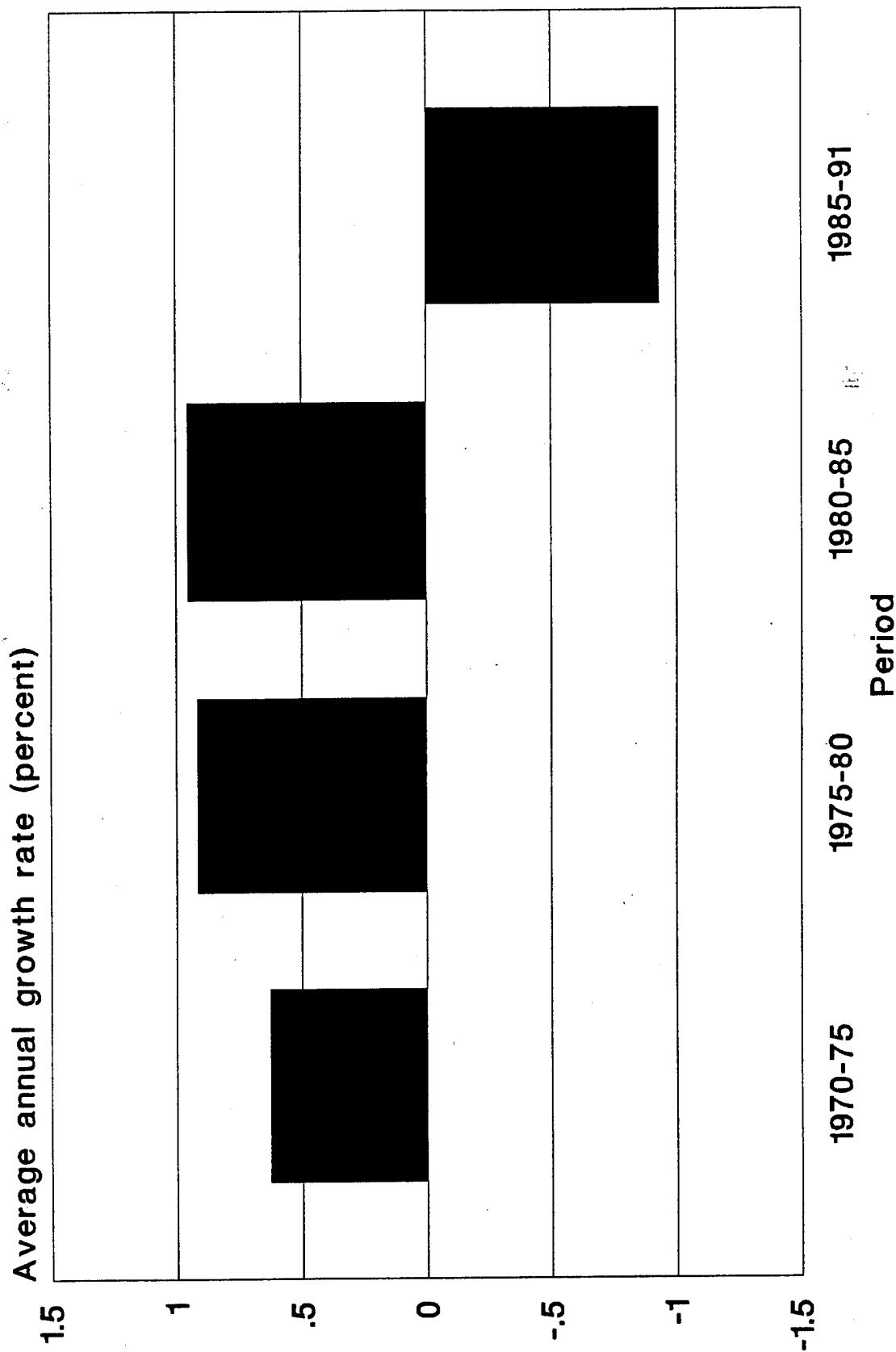
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95. Brown and Kane, 1994; Brown, 1994; Brown, 1995.

96. Brown et al., 1994, 27; USDA-ERS, 1994.

97. Avery, 1994.

Figure 12. Growth rate of world per capita grain production, 1970-1991



Source: Worldwatch Institute, 1994.  
 Note: Growth rates calculated based on 3-year moving average.

pay for imported food required by growing populations. World competition for a resource as vital as food is a formula for increased international and internal strife. As John Bongaarts said, "... the future of global food production is neither as grim as the pessimists believe nor as rosy as the optimists claim."<sup>98</sup>

For the countries of the Asia-Pacific Region, the growth rates of per capita grain production have been more favorable than the world total, but the tendency toward slower growth of per capita production is evident (figure 13). All of the countries shown in figure 13 except Bangladesh show a lower growth rate of per capita cereal production in 1985-91 than in 1980-85, although, in contrast to the global picture, the rates are all still positive except for Thailand. Because Thailand is an exporter of grain, reduced production may be a response to prices, supply, and demand for grain on the international market.

Food production is a function of the amount of land in production, the mix of crops produced, and the yield of the crops. Yields can be raised by increasing inputs, such as fertilizer, irrigation, and higher yielding varieties. Trends in these factors of agricultural production can point to the potential for increased production.

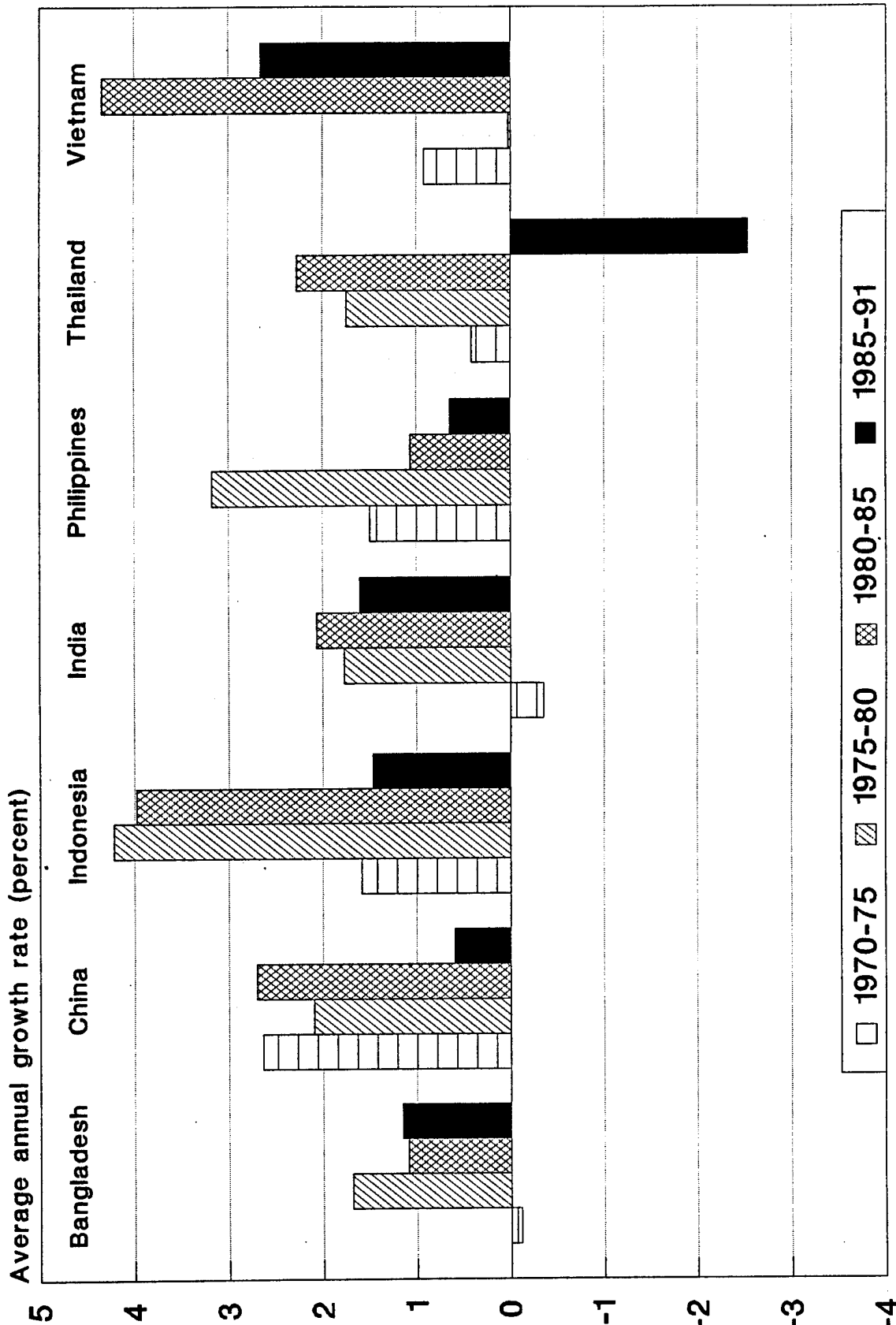
The availability of arable and permanent cropland per capita is declining for most countries in the region (figure 14) because the total area is remaining almost constant or declining and the population is increasing. In many countries, some of the best arable land is being lost to urbanization, housing, industries, roads, and reservoirs. Attempts to bring marginal lands into cultivation can bring short-term benefits, but only at high costs of inputs such as water and fertilizer, or in some areas at great risk of topsoil erosion and loss of soil usability.

Figure 15 shows that the percent of arable and permanent cropland that is irrigated varies widely in the region. Japan has an astounding 62 percent irrigated. In China, almost half the cropland is irrigated, compared to less than 20 percent for the Philippines and Thailand.

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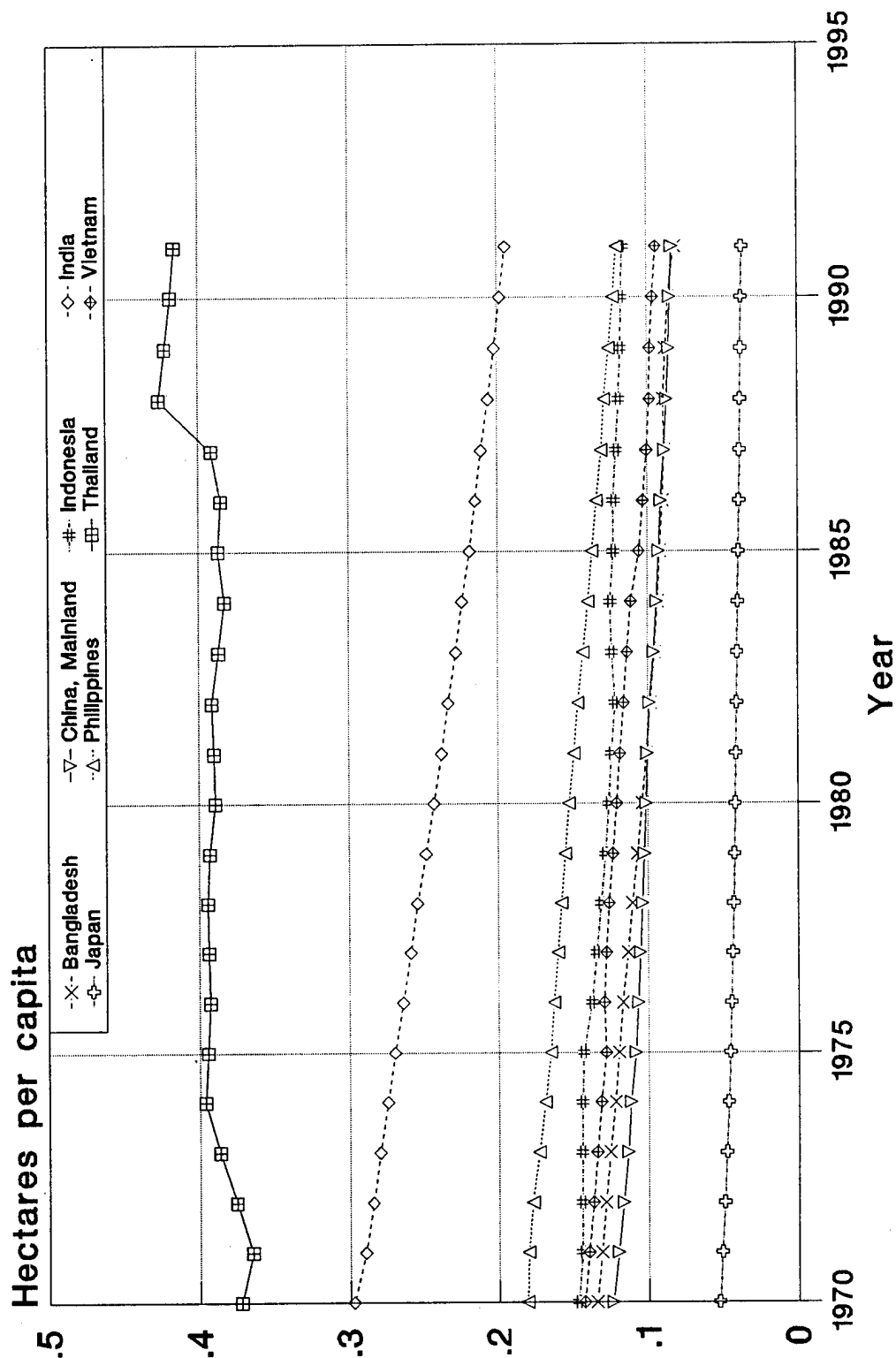
98. Bongaarts, 1994.

**Figure 13. Growth rate of per capita cereal production, Asia-Pacific countries, 1970-1991**



Source: USDA-ERS, 1993b, and U.S. Bureau of the Census, 1996.  
Note: Growth rates calculated based on 3-year moving averages.

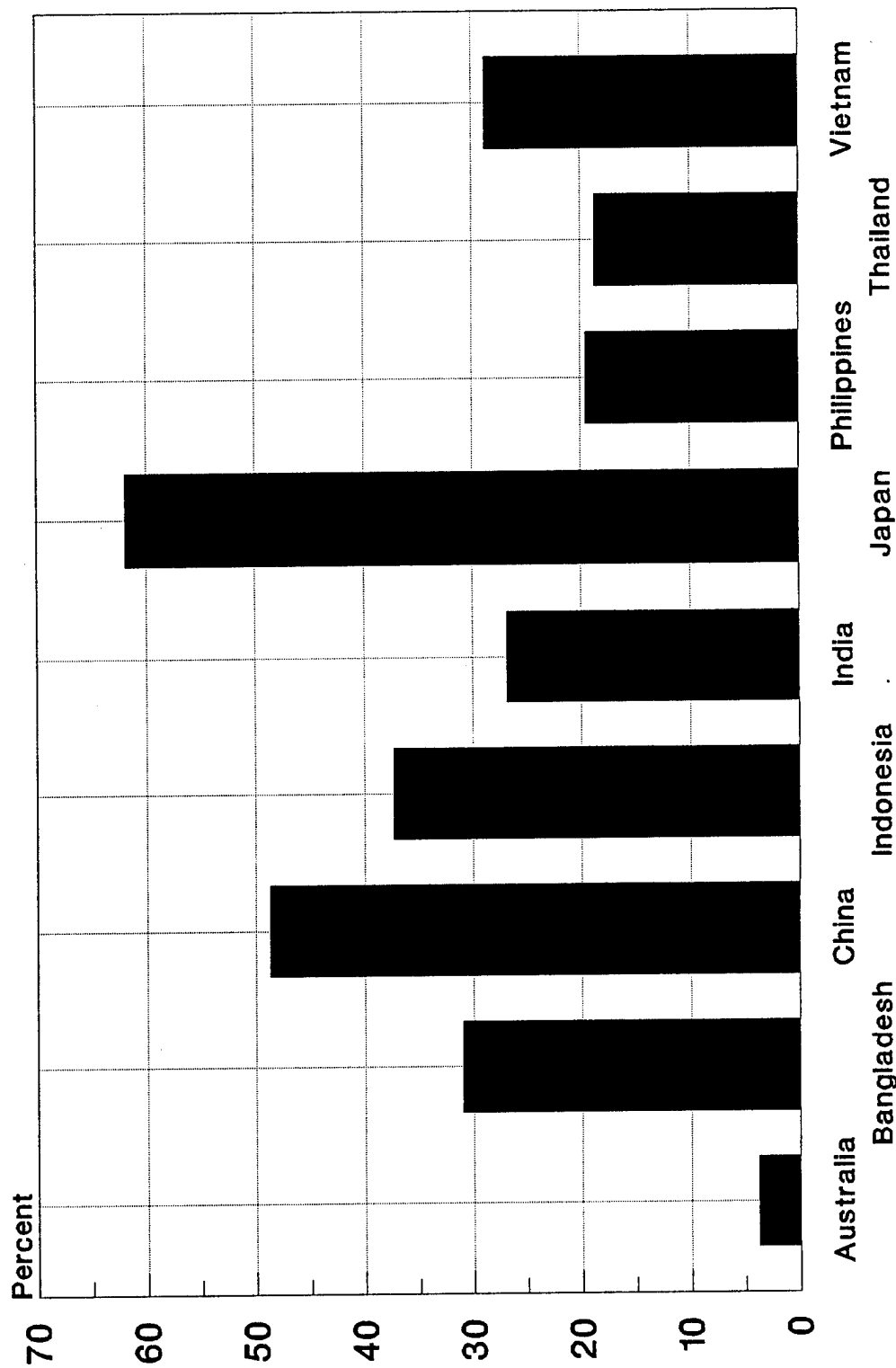
Figure 14. Per capita arable and permanent cropland, Asia-Pacific countries, 1970-1991



Source: USDA-ERS, 1993b; and U.S. Bureau of the Census, 1996.



**Figure 15. Percent of arable and permanent cropland that is irrigated, Asia-Pacific countries, 1989-1991**



Source: USDA-ERS, 1993b.

Figure 16 shows the average annual growth rate of irrigated land since 1970. For most of these countries, there is a clear slowing of the rate at which additional land is being irrigated; the exceptions are Bangladesh and China. In Bangladesh, increased irrigation has resulted from market reforms that made grain prices more competitive.<sup>99</sup>

Fertilizer use is on the increase in the major developing countries of the region (figure 17). China's huge expansion of food production has been fueled by rapidly increasing fertilizer use over the past two decades. When the oil crisis of the early 1970s raised fertilizer prices on the international market, China bought turn-key fertilizer factories in order to domestically produce large quantities of high-quality fertilizer. At low levels of application, fertilizer can dramatically raise yields; however, the yield increase eventually declines at higher doses. Currently, China applies very high levels of fertilizer (over 300 kg/hectare in 1991), raising questions about any remaining potential yield increase from further increments of fertilizer. China's intensive use of fertilizer also raises concerns about water pollution.

Over the past 20 years, cereal yields as a whole have continued to grow in most populous Asia-Pacific countries (figure 18). The exceptions are Japan, which has apparently hit the limits on yield, and Thailand, which has emphasized expanding crop area to raise more food. Rice, the most important staple grain in the region, shows a similar pattern (figure 19). It is important to note from figure 19 that paddy-rice yields in China are approaching what looks like a high and steady limit on yields apparently reached by Japan decades ago. This may signal that China has little room for yield increases given current rice-growing technology.

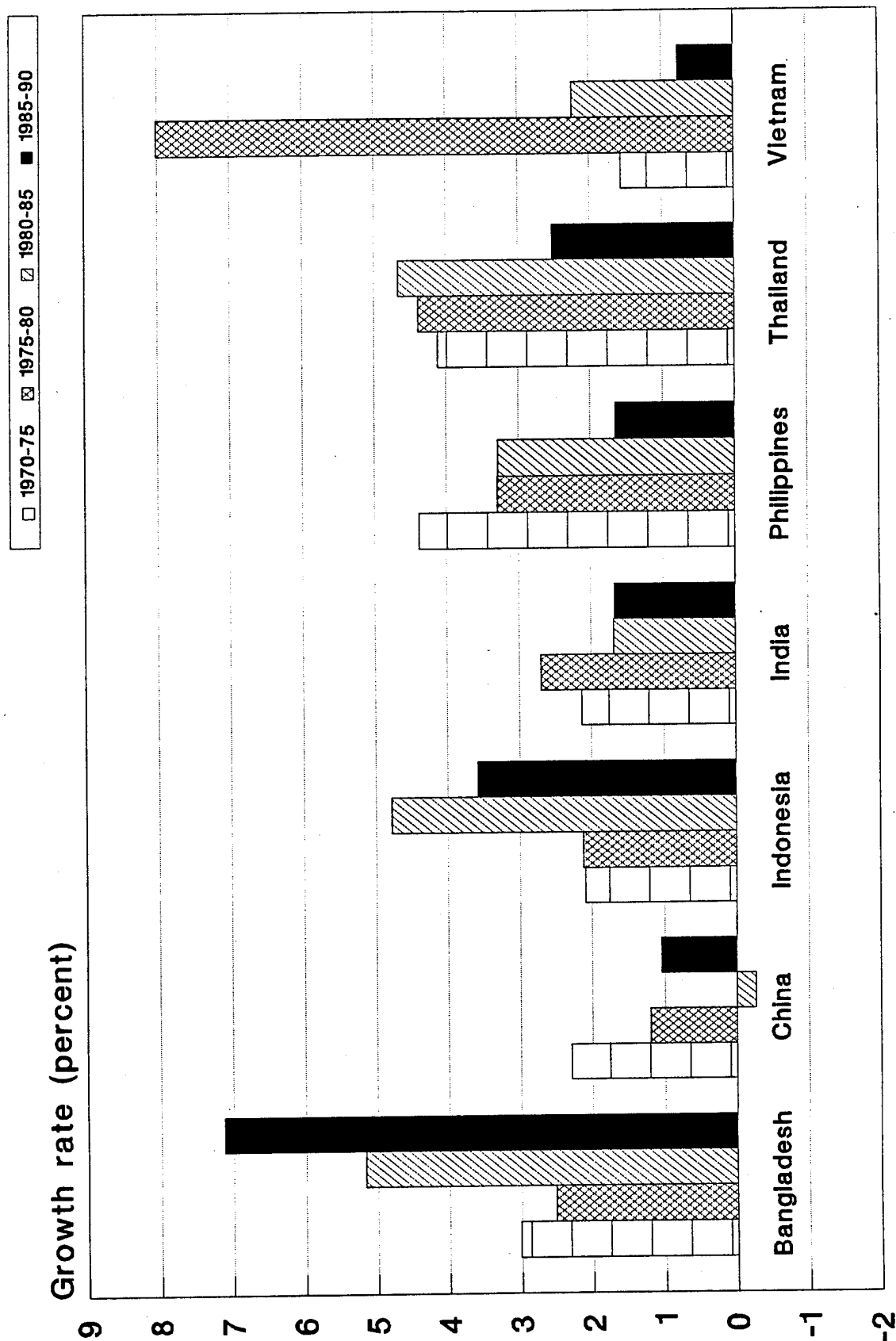
In Asia, only China and India are major wheat-producing countries, and their yields have continued to climb, faster for China than for India (figure 20). By the early 1990s, China was producing 3.0 to 3.5 metric tons per hectare of wheat, compared to 2.1 to 2.3 tons/hectare for India and 2.2 to 2.7 tons/hectare for the U.S. rainfed wheat crop.<sup>100</sup> Corn yields for the major corn-growing countries (figure 21)

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99. USDA-ERS, 1994, 54.

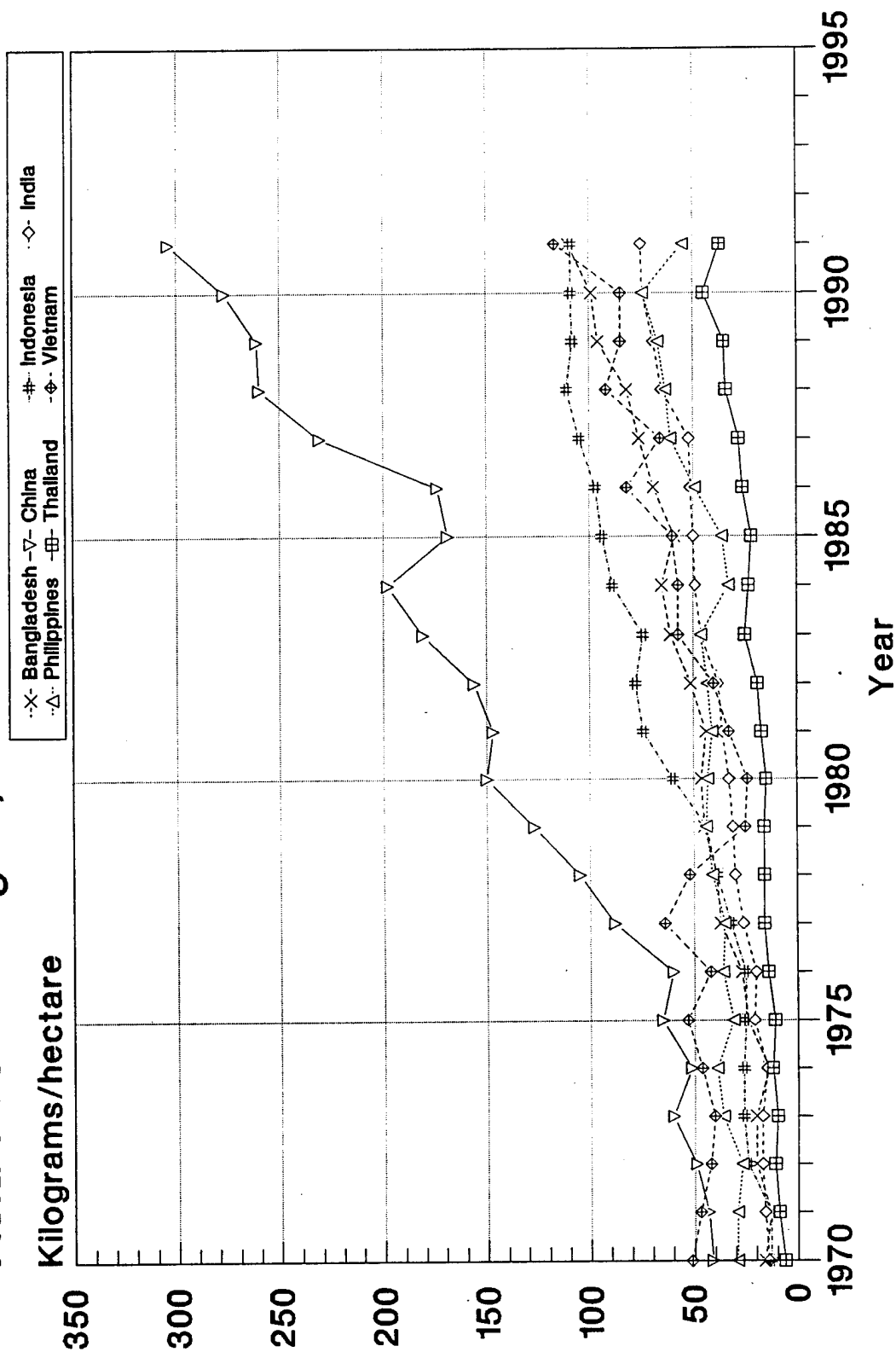
100. USDA-ERS, 1993b, 69, 283, 551; and Brown, 1995, 78-79.

Figure 16. Average annual growth rate of irrigated area, Asia-Pacific countries, 1970-1990



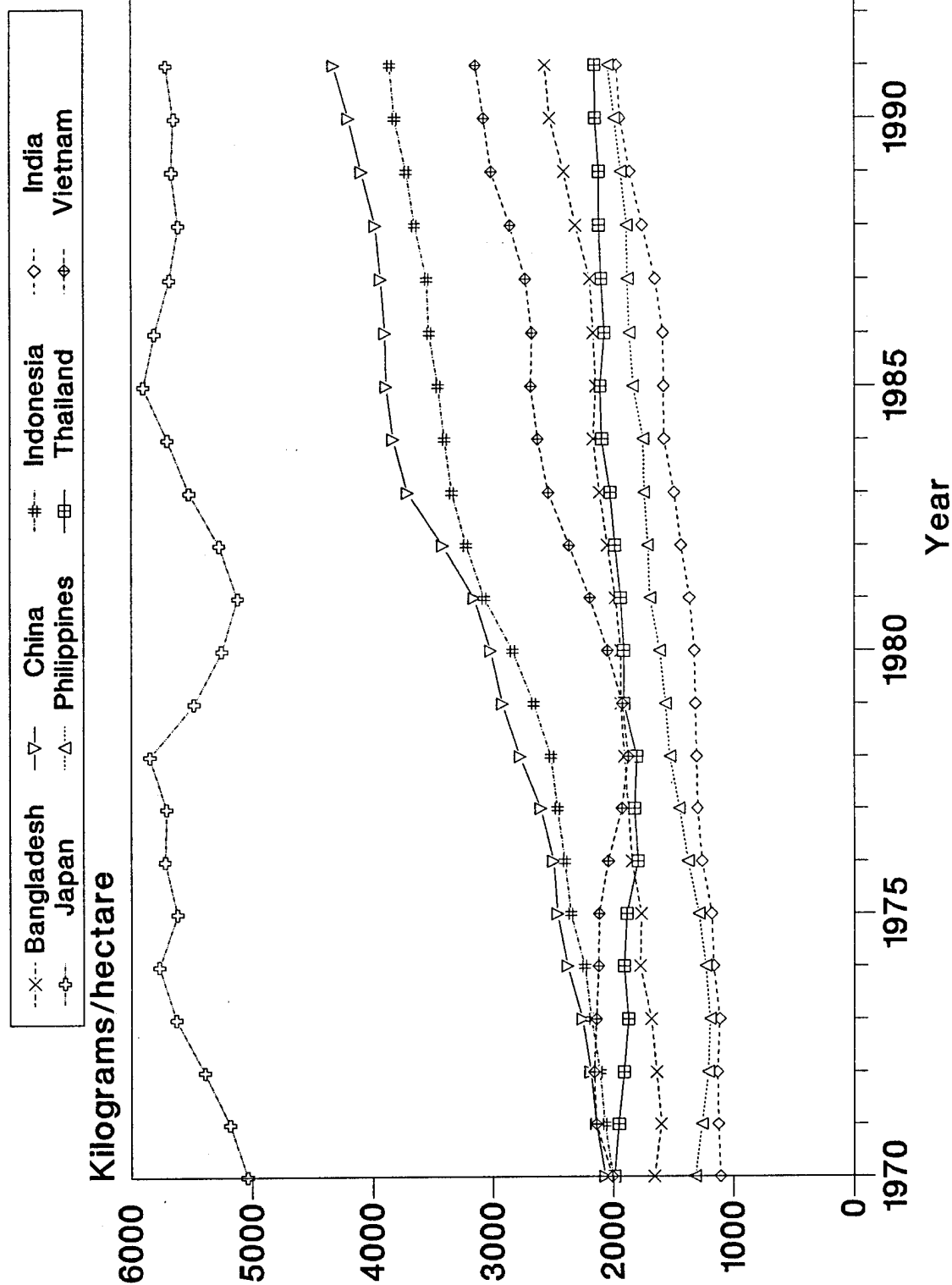
Note: Growth rates calculated based on 3-year moving averages.  
Source: USDA-ERS, 1993b.

Figure 17. Fertilizer use by country,  
Asia-Pacific Region, 1970-1991



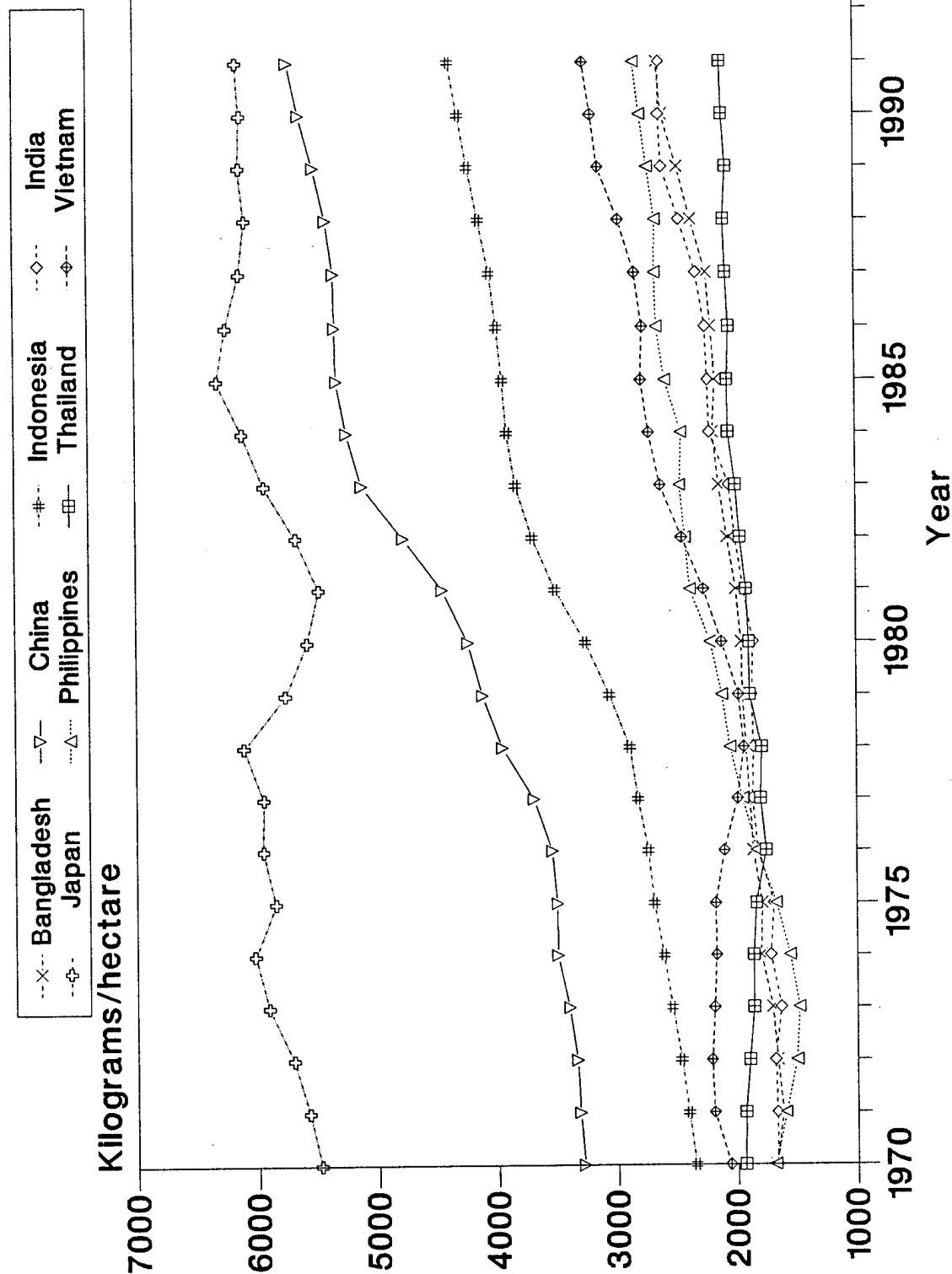
Source: USDA-ERS, 1993b.

**Figure 18. Yields of total cereals,  
Asia-Pacific countries, 1970-1991**



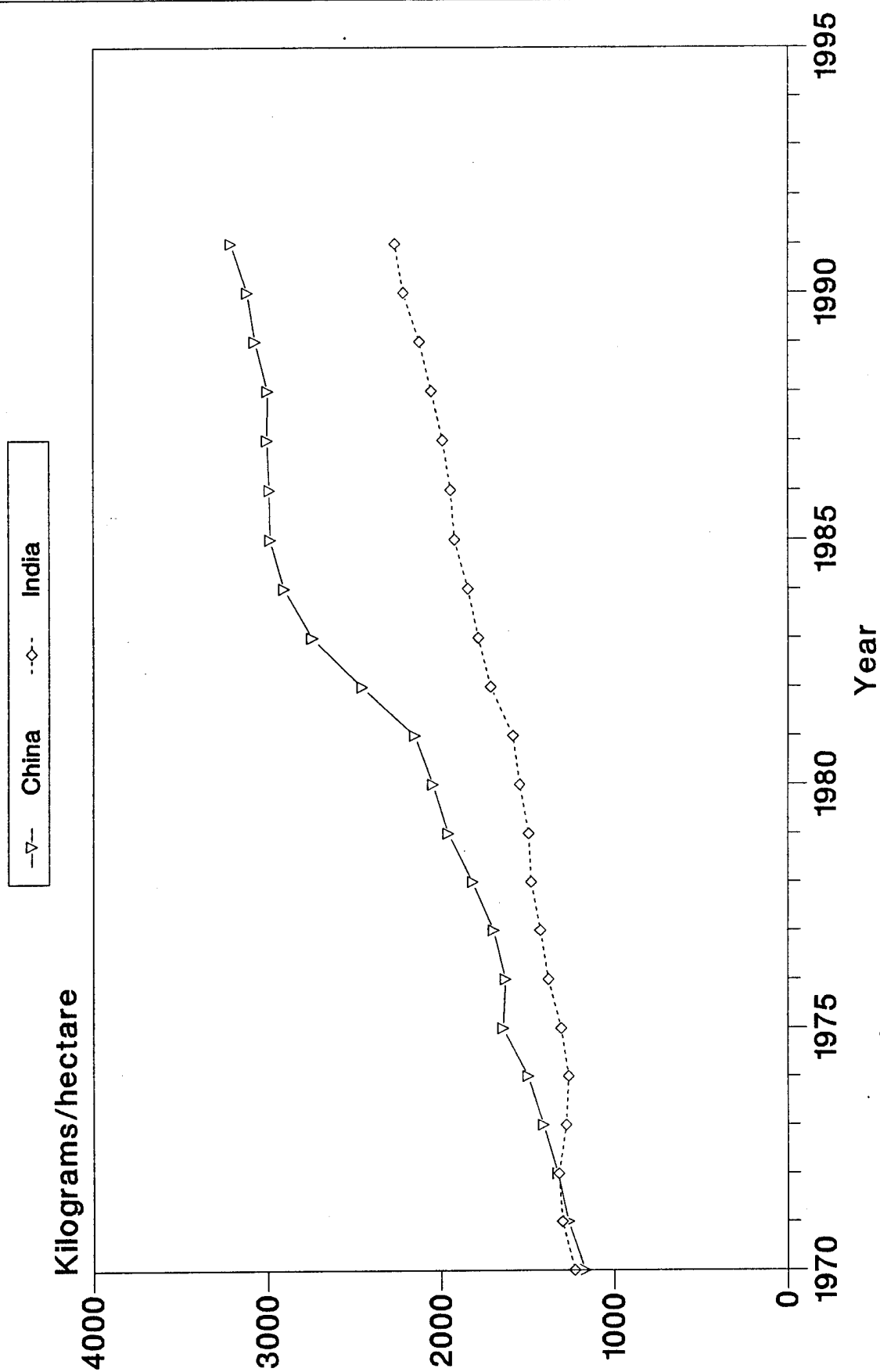
Note: 3-year moving average.  
Source: USDA-ERS, 1994.

**Figure 19. Yields of paddy rice, Asia-Pacific countries, 1970-1991**



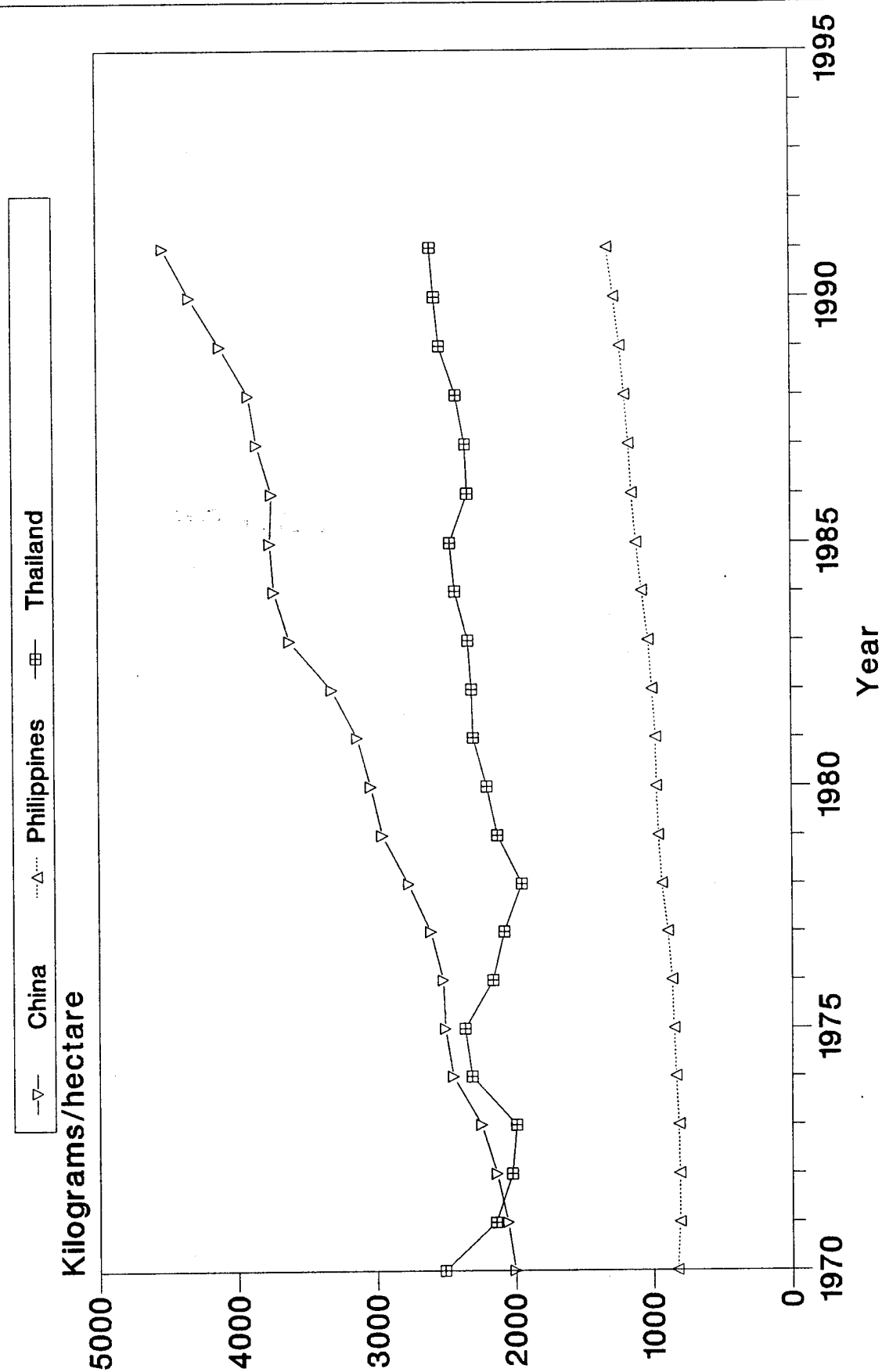
Note: 3-year moving average.  
Source: USDA-ERS, 1993b.

**Figure 20. Yields of wheat, China and India, 1970-1991**



Note: 3-year moving average.  
Source: USDA-ERS, 1993b.

**Figure 21. Yields of corn (maize),  
Asia-Pacific countries, 1970-1991**



Note: 3-year moving average.  
Source: USDA-ERS, 1993b.



show the following pattern: China has high yields that have risen for two decades. Thailand and the Philippines have far lower corn yields than China, and their yields are rising only slowly.

On the consumption side, the countries of the Asia-Pacific Region are generally increasing the amount of food available for human consumption, raising per capita availability of calories and protein (figures 22 and 23). As countries develop, there is more demand for higher quality food, including more animal products. This requires considerably more grain (or other animal feed) than if humans eat the grain directly.

A new "green revolution" based on the development of new grain varieties is one possible solution to the dire predictions of food shortages in the coming decades. A new rice variety being developed at the International Rice Research Institute (IRRI) in the Philippines could boost the best current rice yields by 25 percent.<sup>101</sup> If planted in all suitable parts of the world's rice-growing regions, agronomists estimate it could yield 100 million metric tons more rice than now grown, enough to sustain an additional 450 million people per year if fully exploited.<sup>102</sup> Asia has 89 percent of the world's rice-growing area.<sup>103</sup> An increase of 538 million people is projected for the Asia-Pacific Region over the next 15 years. So it is possible that the new "super rice" could feed a large proportion of the added people in Asia by 2010. But the Consultative Group on International Agricultural Research (CGIAR), a consortium of 16 research centers like IRRI worldwide, estimates that demand for rice will increase 70 percent or by about 330 million metric tons between 1995 and 2025 in the Asia-Pacific Region.<sup>104</sup> It is not clear whether new strains of rice will be able to meet this increased demand.

The question in the near future is whether the implementation of such technological developments can proceed fast enough to

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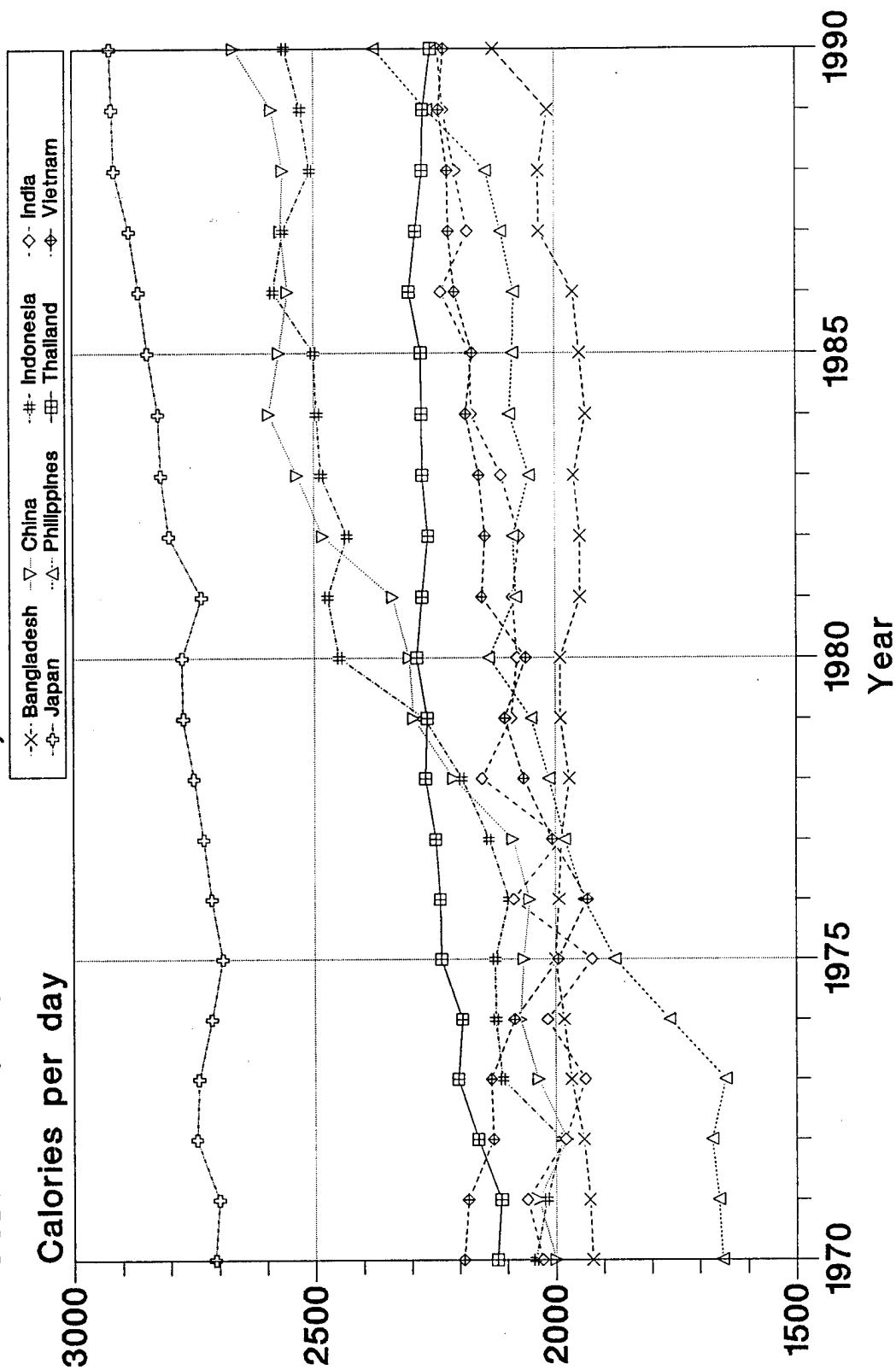
101. Rensberger, 1994.

102. Rensberger, 1994.

103. USDA-ERS, 1993b.

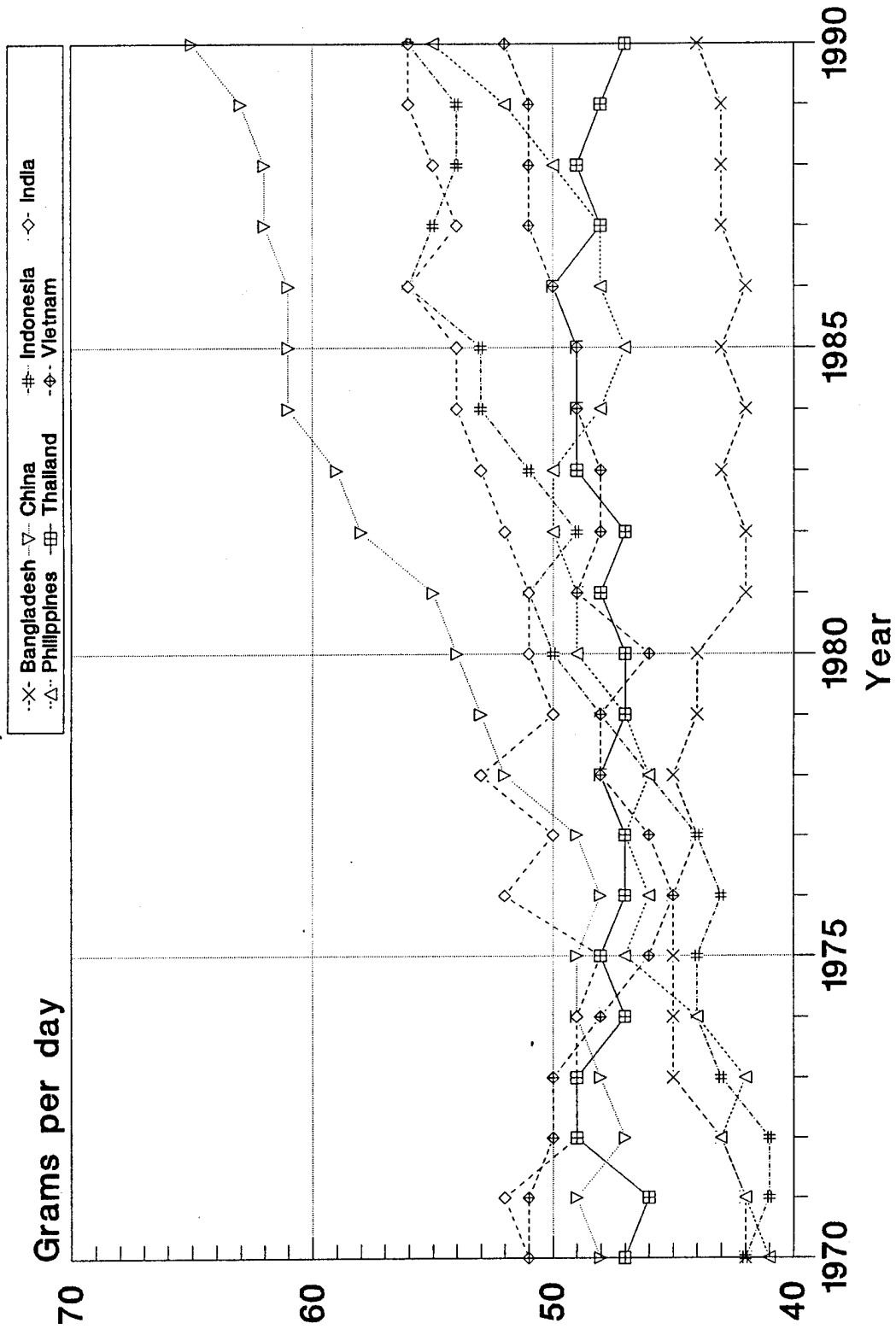
104. Anderson, 1995.

Figure 22. Per capita calorie supply,  
Asia-Pacific countries, 1970-1990



Source: USDA-ERS, 1993b.

Figure 23. Per capita protein supply, Asia-Pacific countries, 1970-1990



Source: USDA-ERS, 1993b.

outpace the increase in population. The new "super rice" is not yet ready to release to farmers; introduction is expected after the turn of the century. Most of the rice-growing countries appear to be producing rice well below potential yields, based on the available information on their yields, irrigation, and fertilizer use. China, however, may be approaching maximum potential yield on much of its rice land, given the limits of current technology.

Table 16 shows the net import needs for grain in Asian developing countries in the future, as projected by several different organizations. The sources seem to disagree on how many million metric tons of grain were exported and imported in 1990, and therefore the net import amounts for some countries. In projecting to 2010, the Food and Agriculture Organization (FAO) of the United Nations sees only a small increase in East Asia's net grain-import needs. The World Bank foresees a more considerable jump, with all of the increased need being attributed to rising grain imports by China. In Southeast Asia, Thailand is expected to remain a net exporter of grain. For South Asia, FAO and the World Bank foresee only a modest absolute increase in net grain import needs by 2010, dominated by India. Overall, Asia's expected increase in net grain import needs is moderate and would appear manageable during the coming 15-year period. Projections for a longer time horizon are much more speculative and are likely to be revised as new information becomes available.

No analysis of past agricultural performance or projections of future performance can predict catastrophic events such as droughts and floods, or the potential impact of global warming. If per capita food production does decline in the future, the impact of catastrophic losses in some countries could be magnified.

## **Country-specific assessments**

### **China**

Lester Brown of the Worldwatch Institute (1995) has produced some alarming projections of grain production and consumption over the next 35 years. The most disturbing projection is that, by the year 2030, China would need to import 43 percent of its grain, or 207 million metric tons, if there were no increase in per capita consumption.

But if rising incomes raised grain consumption in the China mainland to that of China (Taiwan) today, Brown projects the need to import 369 million tons of grain, 58 percent of the demand (table 16). Brown projects that there may not be sufficient surpluses in other countries to meet this demand. This forecasted deficit is the result of rising demand coupled with a projected 20-percent decline in grain production in China. This decline is based in part on the assumption that rapid industrialization and urbanization will remove agricultural land faster than productivity on the remaining land can be increased. Brown and his colleagues have assumed that the reduction in China's grain area between 1990 and 1992 (and further to 1994) is a trend that will continue to 2030, resulting in considerable loss of 1990 grain area (figure 24). Brown bases his expectations for China on the experience of Japan, South Korea, and China (Taiwan).

There is some concern that China will not be fully able to meet food demand early in the next century because of (1) urbanization and development taking over too much top-quality agricultural land, (2) rapid rise in demand for meats and other animal products that require a much-increased grain supply to produce, and (3) shortages of water for agriculture in the northern half of China.

Crook<sup>105</sup> (1994) has criticized earlier versions of the Brown projections on several grounds. Crook notes that a major assumption Brown made is that there will be no economic or policy response to adjust production and consumption, which seems unrealistic in the increasingly market-oriented China. There is evidence that, in China, cropland area has for decades been underestimated by about 40 percent, which has inflated the estimates of yield. Finally, the decline in fertilizer use in 1993 and 1994 was due to price adjustments, not to the diminishing returns as asserted by Brown.

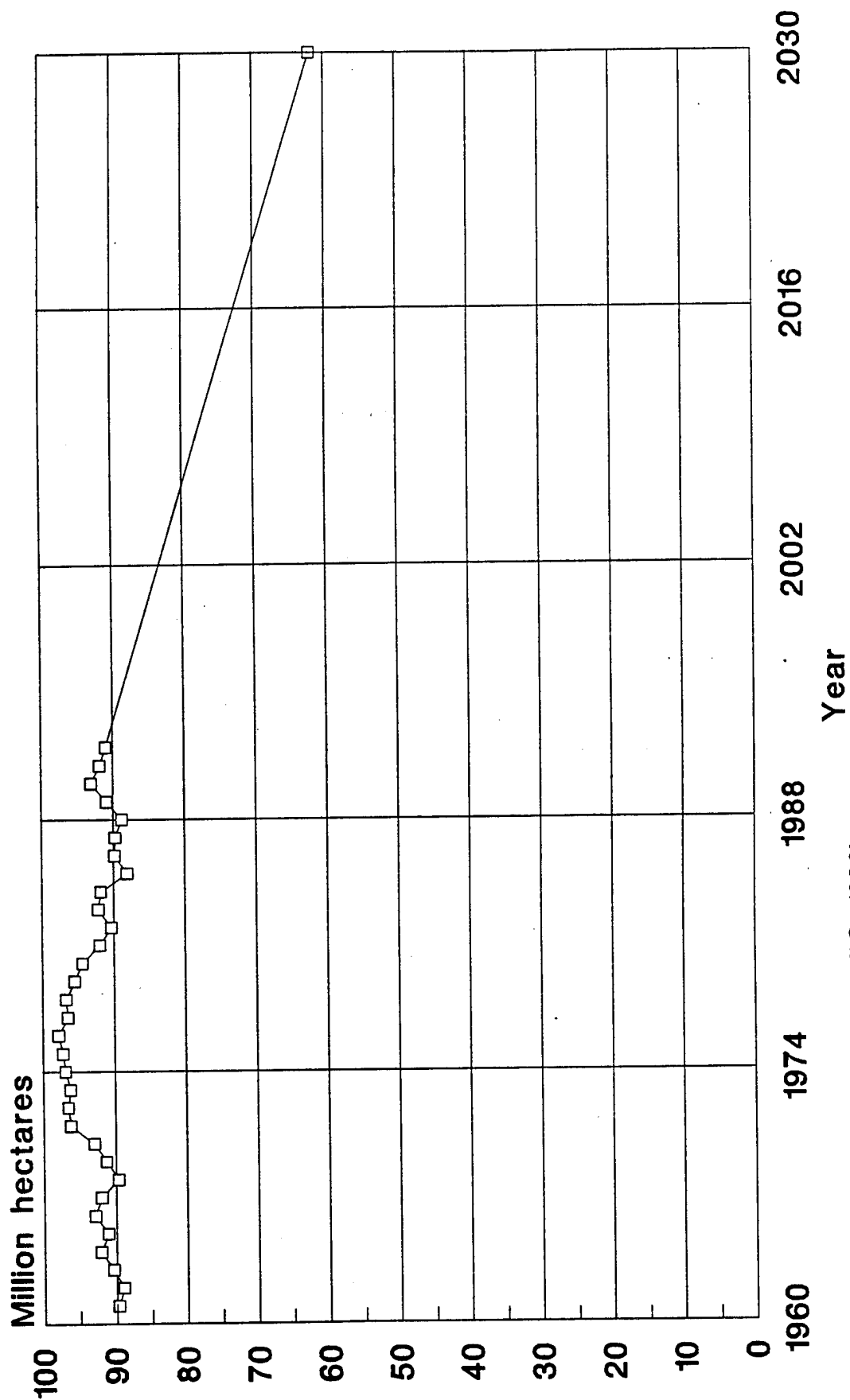
Other projections of the grain balance in China are less pessimistic. USDA<sup>106</sup> projections "indicate that China will be a small net exporter of rice and a growing net importer of wheat in the 1990's." These

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105. Crook, 1994.

106. USDA-ERS, 1993a.

**Figure 24. Brown and Kane projections of China's harvested grain area to 2030 and reported 1961-1992 figures**



Sources: 1961-1992--USDA-ERS, 1993b.  
2030--Implied by Brown and Kane, 1994, 170-171.

projections produce estimated net imports of 17 million metric tons of wheat in the year 2000, a 31-percent increase over 1990. The International Food Policy Research Institute also foresees that China's future food import needs will be manageable.<sup>107</sup>

USDA's projected production levels for China as a whole do not indicate a serious food problem during the coming decades. However, limited food shortages in some areas, combined with infrastructure problems ("transportation bottlenecks") that prevent the quick distribution of food to those areas, could lead to localized shortfalls, local price increases, and unrest.<sup>108</sup>

Though the Brown (1995) grain projections for China may be excessively alarmist, it is possible that the USDA and World Bank projections for China, and the FAO projections for East Asia dominated by China, are unduly optimistic. The latter projections may not take full enough account of the recent and future loss of huge acreage of China's best delta and plains cropland to urbanization, industries, housing, roads, dams, and other requirements of modernization. Some of the projections may not assume big enough increases in effective demand for meat as the Chinese people become more affluent. Yet the Chinese diet is still very heavy on grains and light on animal or fish protein. Rising incomes are translating rapidly into more demand for meat; nationwide, people ate 40 percent more beef and 10 percent more pork in 1994 than in 1993.<sup>109</sup> It is likely that China will rapidly require either increased imports of feed grains to produce more meat or simply more direct meat imports.

Even if the need for grain imports rises very quickly in China, land-rich countries such as the United States have much good agricultural land lying fallow that could be brought into production to produce grain exports for China. So China's demand for feed and food during the next decade or two is not likely to cause a regional or global shortage of food. However, the higher world grain prices that would be

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107. Rosegrant et al., 1995.

108. Crothall and Lam, 1994; Gao, 1994.

109. Kahn, 1995, A1.

part of such a scenario could cause hardship in those countries that are much poorer than China but need to import grain. In particular, the International Food Policy Research Institute foresees virtually no improvement in food security and the proportions of malnourished children in most South Asian countries by 2020.<sup>110</sup>

### **India**

Brown and Kane project declining grainland area and an increase in grain imports from none in 1990 to 45 million metric tons in 2030 (table 16). This analysis ignores the changes in the composition of the grain area. USDA-ERS<sup>111</sup> projects increases in the area devoted to wheat and rice and a decrease for coarse grains. The USDA projections show a continuation of net international trade in grains close to 0 in the year 2000. Moderate increases in food prices would result in even higher production.

### **Bangladesh**

Brown and Kane<sup>112</sup> project modest increases in import demand for grain, from 1 million metric tons in 1990 to 9 million metric tons in 2030. They cite two advantages for Bangladesh: a plentiful supply of water (sometimes too much but with the prospect of controlling it), and the current low yields, which should be responsive to efforts to increase production. USDA-ERS<sup>113</sup> projects that food grain self-sufficiency will decline from 93 percent in 1989-91 to 90 percent by 2000, with grain imports rising from 1.6 million metric tons in 1989-91 to 2.6 million metric tons in 2000. Alternative projections assuming faster growth in irrigated areas would reduce import requirements to 1.9 million metric tons. Problems resulting from poor weather conditions and flooding will continue to require periodic increases in imports (commercial or food aid) during the 1990s. Reduced river flow during the dry season, caused by dams in India, could also affect grain production in Bangladesh.

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110. Rosegrant et al., 1995, 19.

111. USDA-ERS, 1993a.

112. Brown and Kane, 1994, 178-181.

113. USDA-ERS, 1993a.



## **Indonesia**

Indonesia already claims the highest rice yields for equatorial countries, so the prospects for further gains are less promising, according to Brown and Kane.<sup>114</sup> Their projections show Indonesian imports of grain will grow from 3 million metric tons in 1990 to 12 million metric tons in 2030. USDA-ERS<sup>115</sup> projects an increase in wheat imports from 2 million metric tons in 1989-91 to 3 million metric tons in 2000, while rice and corn will change from small net imports to small net exports over the same period. Possible agricultural policy changes that may affect yields and/or prices could cause production changes that range in impact from net rice exports close to 1 million metric tons to net rice imports of almost 5 million tons (or 14 percent of rice consumption) in 2000.

## **Philippines**

The Philippines has up to now been the exception to the economic miracle in Southeast Asia. USDA estimates and projections show that the major problem in cereal self-sufficiency is the lack of domestic production of wheat. Demand for wheat resulted in imports of 1.5 million metric tons in 1989-91, and this is projected to increase to 2.5 million metric tons by 2000. The major grains consumed in the Philippines are rice and corn, and projected production and demand will require increasing imports of each, to 0.4 million metric tons of rice and 0.6 million metric tons of corn. Much of the increased corn consumption is for use as feed, which is projected to double over the course of the 1990s. Alternative scenarios, which reflect the impact of different agricultural and economic policies, result in net imports of these grains ranging from 3.0 million to 4.3 million metric tons. The Philippines has potential for increasing agricultural production by increasing irrigation and improving yields, which are well below potential levels. The major question in the Philippines is the future of the economy.

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114. Brown and Kane, 1994, 178-181.

115. USDA-ERS, 1993, 59-68.

### **Thailand**

Although Thailand is the largest rice exporter in the world, it has shown sluggish growth in production and yields compared to many of the other countries in the region (figures 13, 18, 19, and 21). This has resulted from a number of factors. First, Thailand has tended to increase production by expanding the area under cultivation (figure 14) rather than improving productivity.<sup>116</sup> USDA projections to the year 2000 indicate rapid increases in wheat imports (7 percent per year), slow increases in rice production (1.7 percent per year), and moderate increases in rice exports (4 percent per year).<sup>117</sup> With abundant land and low yields, Thailand is in a good position to significantly increase production.

### **Vietnam**

As a result of a series of economic reforms, Vietnam has become a major rice exporter, becoming the world's third largest after Thailand and the United States.<sup>118</sup> USDA projections<sup>119</sup> assume continued growth in production and exports, although at a slower pace than in recent years since it is felt that some of the recent increases were attributable to the policy changes and would not be sustained. In spite of the projected growth of agricultural production and exports, food problems remain, mainly in the form of uneven distribution of food products to some areas resulting from "...poor distribution systems, growing unemployment, and insufficient incomes..."<sup>120</sup>

## **Marine food resources**

Recent developments in fish capture and production could also mar food security in Asia and in the world. After decades of rising rapidly, the world fish catch has remained relatively stagnant since

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116. USDA-ERS, 1993a, 137.

117. USDA-ERS, 1993a, 140.

118. USDA-ERS, 1993a, 145.

119. USDA-ERS, 1993a, 148-149.

120. USDA-ERS, 1993a, 147.

reaching a peak in 1989 (figure 25 and table 17).<sup>121</sup> This has resulted from years of overfishing that have depleted stocks of many fish. Globally, only two of the top eight species caught in 1970 had larger catches in 1992.<sup>122</sup> Overfishing has resulted from many technological developments and the building of larger, more efficient boats. With constant total world fish catch and continuing world population growth, global per capita fish catch has declined annually since 1988.

In Asia, fish catches in the western and eastern Indian Ocean areas both saw steady increases over most of the 9 years shown, while all areas of the Pacific had declines in 1992 relative to the peak years (figures 26, and 27, and table 18). The largest fish catch in the Pacific and Indian Ocean regions is seen in the Northwest Pacific fishing area, where the total catch declined annually from 1988 through 1992.

The UN Food and Agriculture Organization (FAO) projects that worldwide capture production of fish could increase from 86 million metric tons in 1989-91 to between 90 and 110 million metric tons by 2010.<sup>123</sup> This assumes much-improved fisheries management to allow currently overfished areas to recover from overfishing. In addition, FAO predicts that aquaculture production could increase from 12 million metric tons in 1989-91 to 15 to 20 million metric tons in 2010.<sup>124</sup> The lower bounds of these projections would represent an average annual increase in fish production of only 0.3 percent over the 20-year period 1990-2010, while the upper bounds would be about 1.4 percent—a little higher than the projected world rate of population increase. It is possible to speculate that much of this growth will occur in the Indian Ocean area, since it is the only major fishing area with increasing catches, but this assumes that the growth of the catch is managed in order to prevent the very exploitation found in many other areas.

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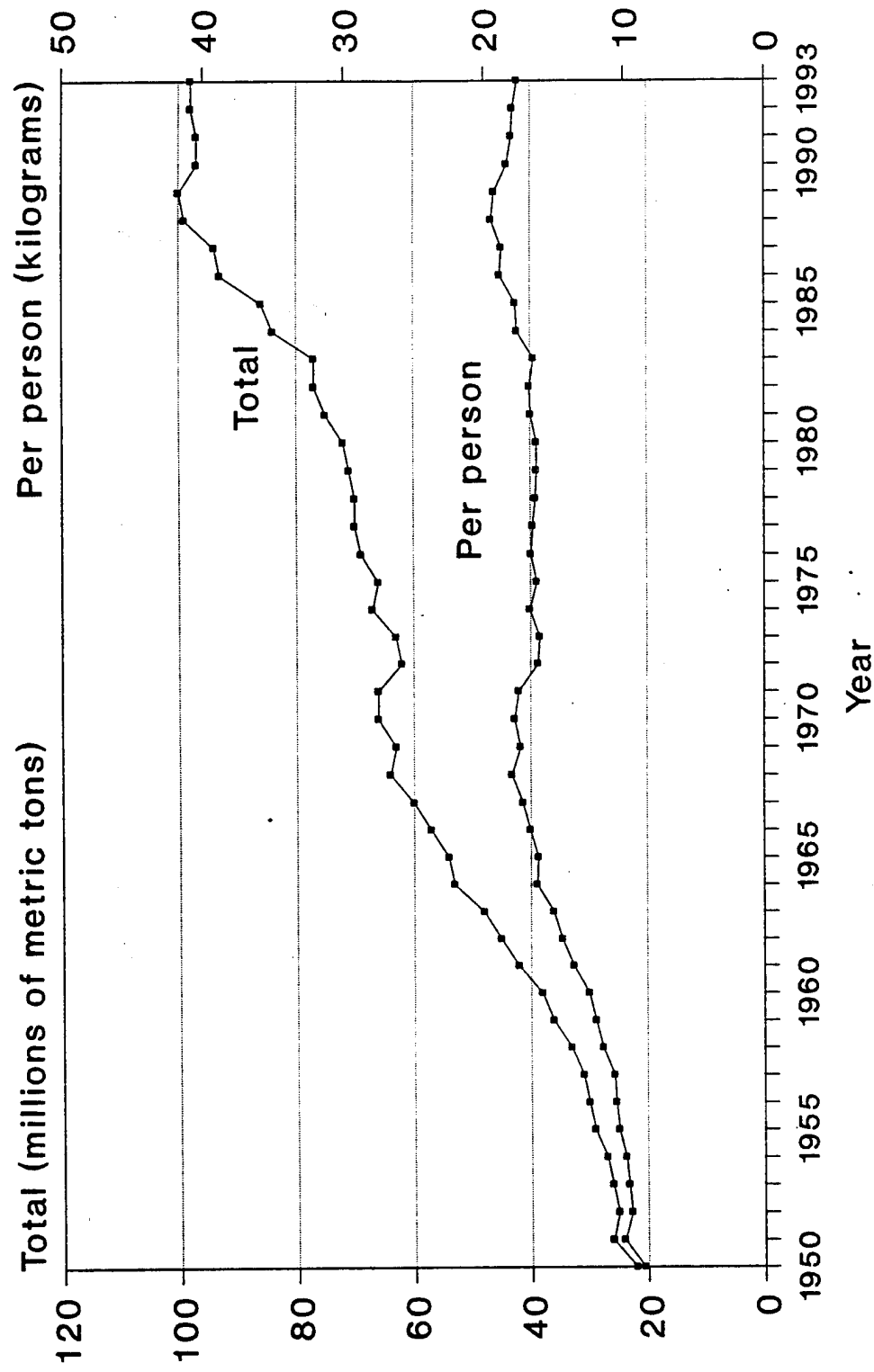
121. Worldwatch Institute, 1994.

122. Weber, 1994, 17.

123. FAO, 1993, 183.

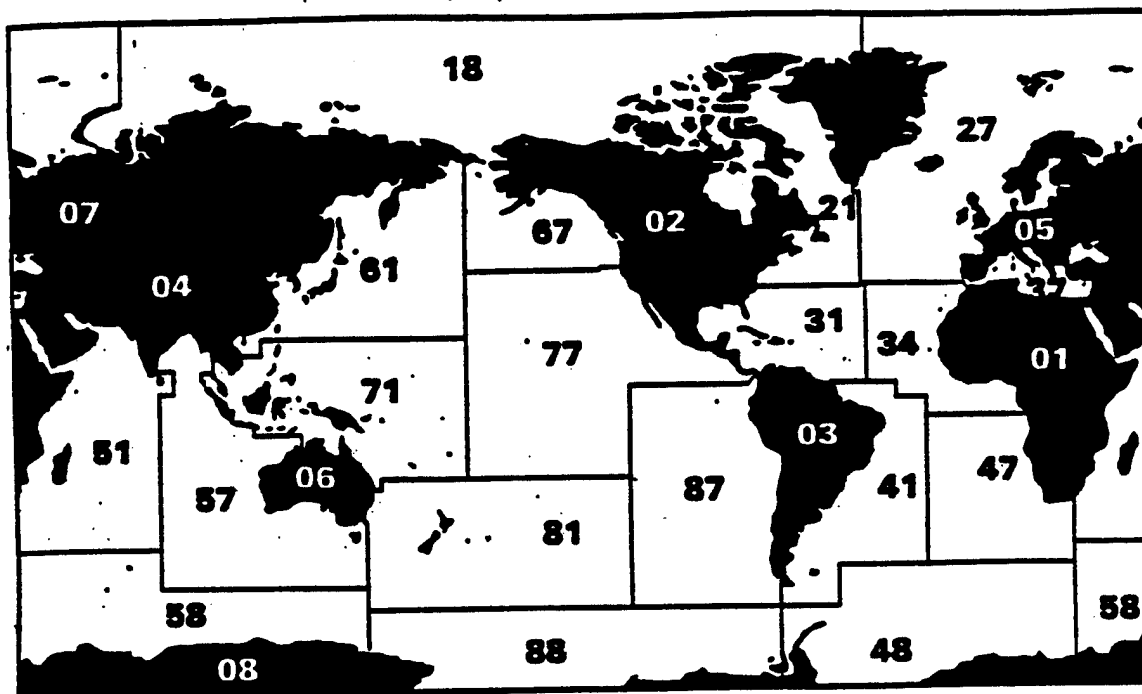
124. FAO, 1993, 183.

Figure 25. World fish catch, total and per person: 1950 to 1993



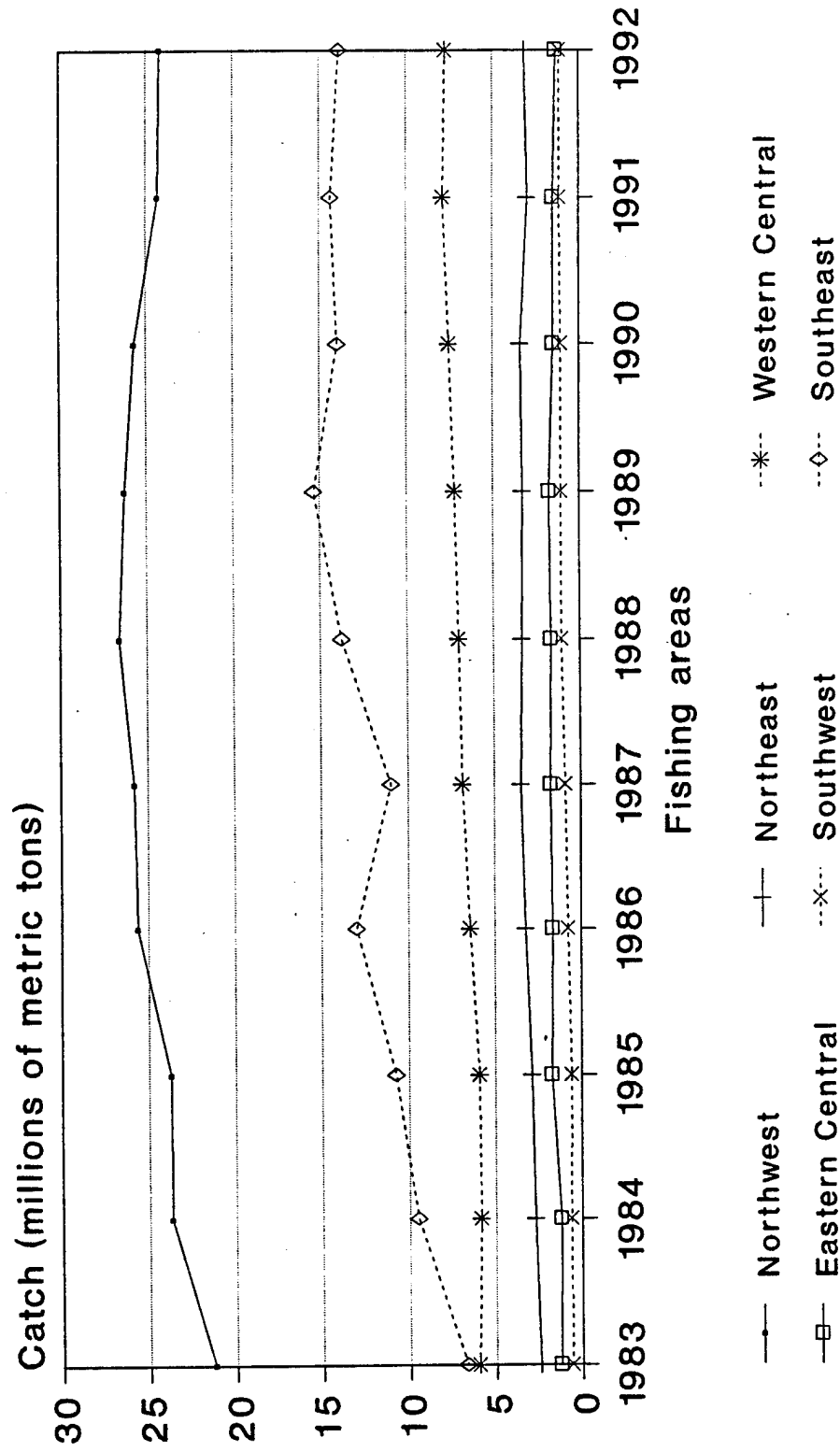
Source: Worldwatch Institute, 1994.

Figure 26. Geographical boundaries of FAO marine statistical areas



Source: FAO, 1994b.

# Figure 27. Pacific Ocean fish catch, 1983-1992



Source: Table 18.

In developed countries, recent attention to eating a healthy diet has increased per capita fish consumption (up by 38 percent from 1970 to 1987, then down 9 percent from 1987-92 in the United States<sup>125</sup>). The increased demand and lower production of fish has resulted in higher prices, some more than doubling between 1985 and 1994.<sup>126</sup>

In Asia, fish supplies 29 percent of the animal-protein consumption (50 percent in the Philippines), compared to 7 percent in North America.<sup>127</sup> In developing countries, high population growth, coupled with rising demand for fish as a source of protein, has increased total demand. The resulting global surge in demand has raised prices, resulting in a race to cash in on this high-priced protein source.

Worldwide, governments have invested in their fishing industries, with subsidies amounting to about \$54 billion per year.<sup>128</sup> With the current situation of depleted stocks and too many fishers, Weber argues, this money would be better spent on fisheries management.

In the race to exploit the oceans, the world now has fishing capacity that is twice the volume of the potential annual catch. The losers in this race are very often the poor local fishers, who are estimated to number 14 to 20 million worldwide.<sup>129</sup> Tensions between local fishers and larger operations have resulted in violence, including the burning of larger ships in India.<sup>130</sup>

Potential conflicts also exist between countries, as the interpretation of international fishing laws and regulations and the lack of effective enforcement leave room for substantial disagreements. Current laws give priority to the country where the fish spawn, but it is difficult to enforce limits on the open ocean. As a result, open-ocean fish, such as tuna, are some of the most depleted species. For example, in 1990,

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125. U.S. Bureau of the Census, 1993, table 220; and 1994, table 218.

126. Mayer, 1994.

127. Swardson, 1994, A28; Weber, 1994, 37.

128. Weber, 1993, 53.

129. Weber, 1994, 33.

130. Moore, Aug. 14, 1994, A29.

the total tuna catch by Japan was less than 1 percent above the 1970 catch, but it was down 25 percent from the peak catch in 1985.<sup>131</sup> Some developing countries are selling fishing rights to other countries to cash in on the demand for fish and viable fishing areas, but this may reduce the fish available to small local fishers. Conflicts have already occurred, for example, between Indonesia and the Philippines over the Celebes Sea and between China and the Marshall Islands over waters in Micronesia.<sup>132</sup> These conflicts can only multiply as demand for fish rises with increasing population growth and higher incomes, and as stocks decrease in the Pacific. Some agreements have been made among fishing countries to ban fishing in certain areas of the ocean to allow renewal of stocks.

The reduced catch has also resulted from pollution and development of coastal areas that have destroyed mangrove swamps and other areas that are important to the life cycle of many species. For instance, pollution of China's Hangzhou Bay and Zhousan Fishing Area is threatening marine resources in the area, and may spread to the East China Sea.<sup>133</sup>

One hope for increasing fish supplies lies in aquaculture, which has been expanding rapidly in recent years (figure 28). However, careless aquaculture production can easily interfere with the environment (by destroying coastal habitats, for example) or affect wild marine life (by becoming a breeding ground for diseases, for instance).<sup>134</sup>

Increased ocean catches, in the long run, can result only from consistent management of stocks, including bans on fishing of certain species or areas to allow the stocks to return to sustainable levels. So far there is little indication that countries and individual fishers will cooperate enough to leave overfished areas alone and allow fishing stocks to recover.

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131. Japan Statistics Bureau, 1992, table 5-62.

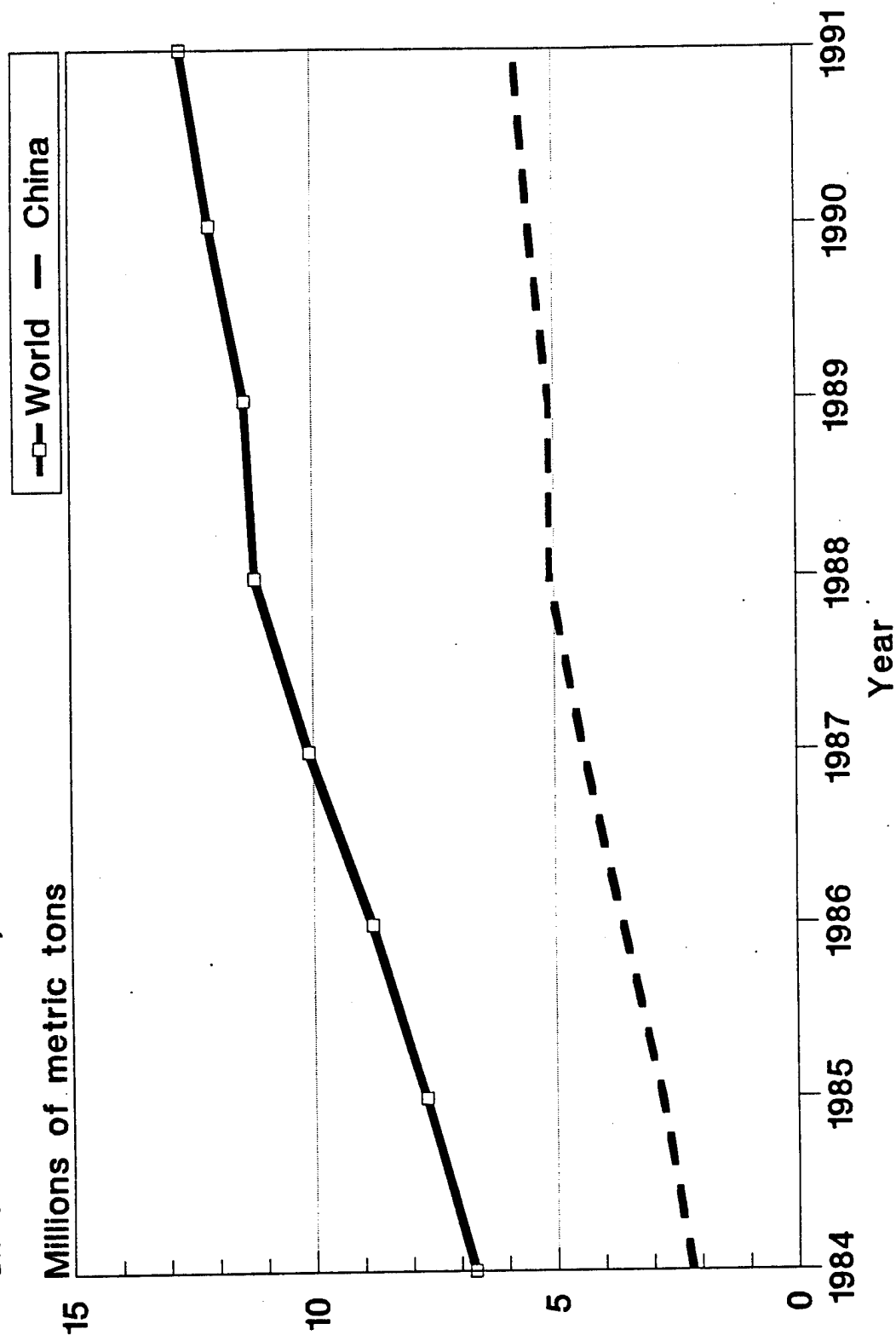
132. Trueheart, 1994.

133. Brandon and Ramankutty, 1993, 142.

134. Weber, 1994, 44.



Figure 28. Aquaculture output for China and the world, 1984-1991



Source: Worldwatch Institute, 1994.

## Country-specific assessments

### China

China has surpassed Japan and is now the global leader in fish catch (figure 29). The fish catch in China has increased substantially in recent years, tripling from 5 million metric tons in 1983 to 15 million metric tons in 1992, mostly due to increased aquaculture harvests of freshwater carp species. The Chinese hope to increase fish catch from 15 million metric tons recorded in 1992 to 20 million metric tons by the year 2000. Much of this will be due to increased aquaculture harvests, but distant-water fishing is also expected to contribute.

In spite of the rosy picture painted by the rising Chinese catch, there are contiguous fishing areas with substantial declines. The East China Sea and Yellow Sea have seen a serious depletion of demersal (bottom-feeding) stocks, currently estimated to be at most one-fifth of their highest level.<sup>135</sup>

"China possesses the only major Asian distant-water fishing fleet which is still growing significantly."<sup>136</sup> Data on the size and catch of the fleet are difficult to find, but table 19 shows evidence of this growth. China's number of distant-water vessels is tiny compared to Japan and Taiwan. China is expected to attempt to fill some of the gap left by the recent declines of the Japanese, Korean, and Taiwanese fleets.

### Japan

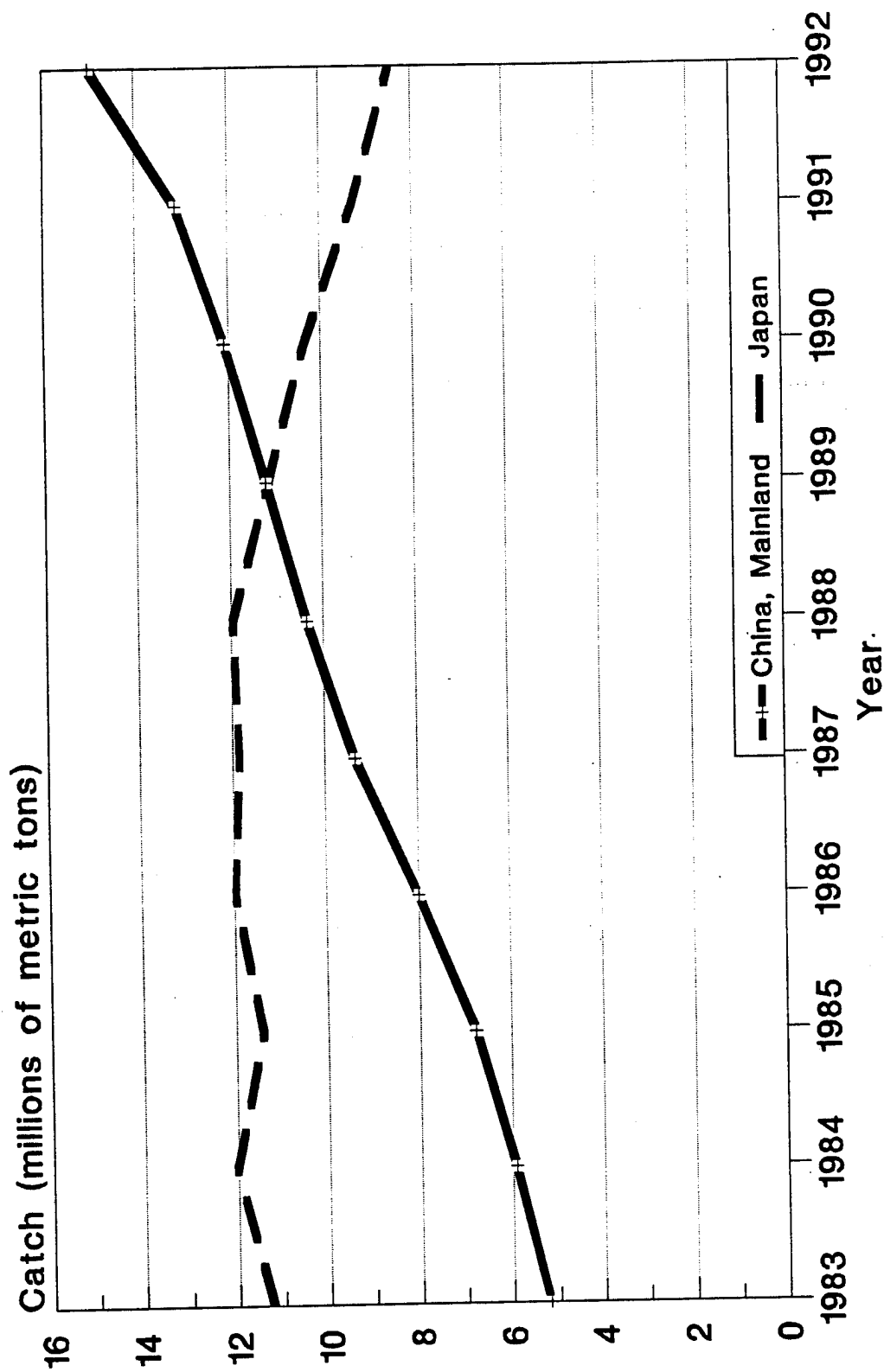
The Japanese fish catch has been declining since 1988, after being relatively constant at peak catches of about 12 million metric tons between 1984 and 1988 (figure 29). This follows the world pattern of peak catches in the late 1980s. The stocks of cephalopods (e.g., squid) around Japan are considered fully exploited, but oceanic stocks offer higher potential catches.

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135. FAO, 1994b, 56.

136. U.S. NOAA, 1993, 14.

**Figure 29. Fish catches by China and Japan:  
1983-1992**



Source: FAO, 1994a, 533-534.

Japan's fishing effort has been declining rapidly in recent years.<sup>137</sup> The number of large fishing vessels (over 100 gross registered tons) declined by 10 percent between 1989 (its peak) and 1991 after a gradual rise from 1986 (table 19). The problems of maintaining its distant-water fishing fleet are mainly due to: (1) the inability to attract young job seekers to distant-water fisheries, (2) constantly increasing wages, (3) increasingly depleted foreign coastal fishery resources, and (4) increasingly restricted and expensive access to distant-water fisheries.<sup>138</sup>

As a result of the decline in the Japanese fishing industry, construction of new vessels has declined, as has the export of new vessels, dropping from 85 in 1980 to 1 in 1992. The export of used fishing vessels has increased from 86 in 1980 to 153 in 1992. Most exported Japanese fishing vessels have been bought by China and flag-of-convenience nations, especially Panama and Honduras.

The advent of the United Nations Convention on the Law of the Sea (UNCLOS) in 1982 has increasingly limited Japanese access to foreign waters. The only major conflicts over fishing rights are Japan's accusations that South Korean trawlers are fishing illegally off Hokkaido and western Honshu.<sup>139</sup>

### **South Korea**

Catches for South Korea also follow the world pattern, with a peak catch of 3.1 million metric tons in 1986 (figure 30). The Korean fleet showed a rapid rise of 23 percent from 1985 to 1989, followed by a 4-percent decline over the next two years (table 19).

### **China (Taiwan)**

Catches for China (Taiwan) rose by 57 percent between 1983 and 1990, but then declined, the 1992 catch of 1.3 million metric tons representing a decline of 9 percent from the peak (figure 31). Similarly,

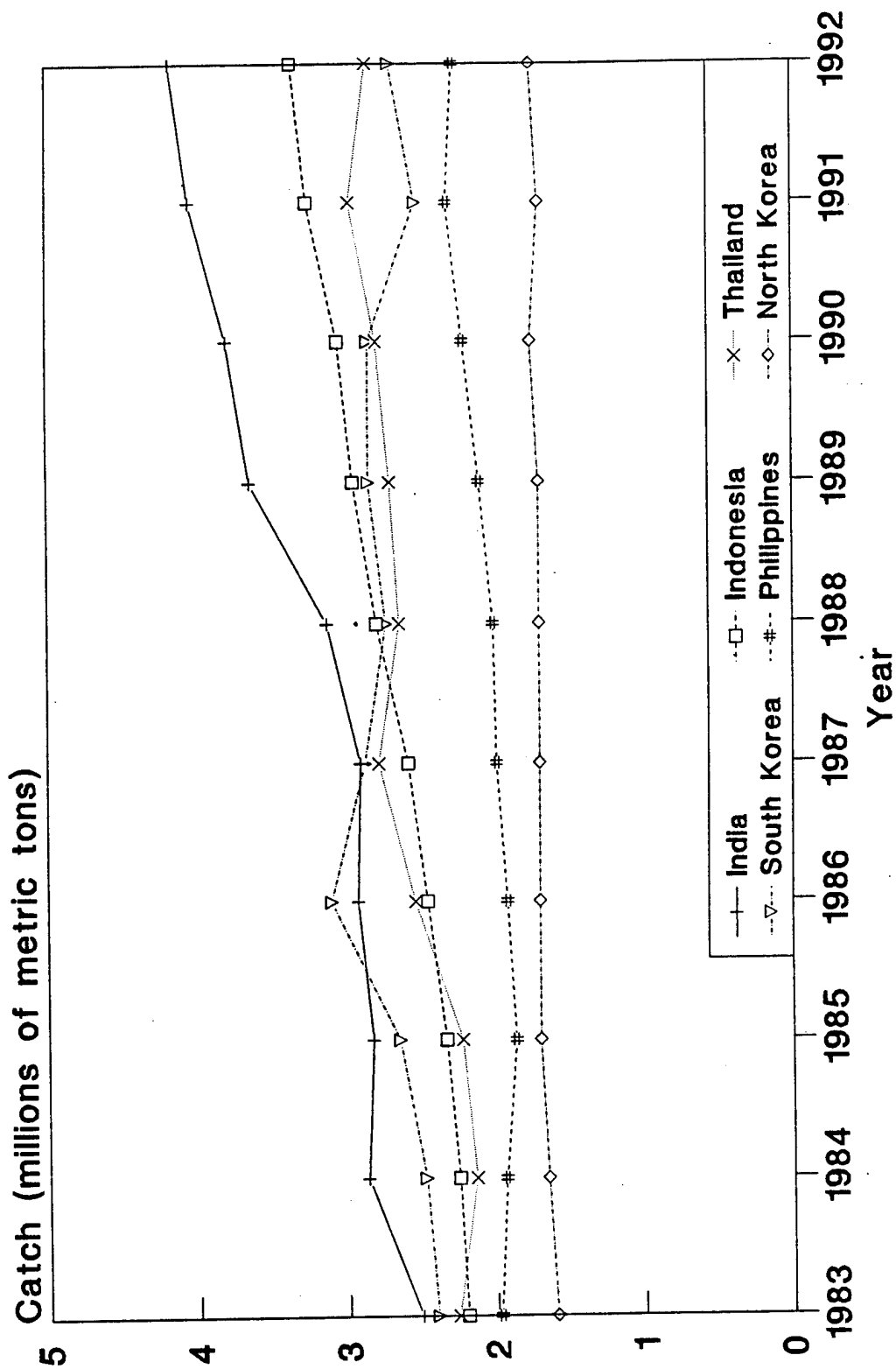
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137. U.S. NOAA, 1993, 26-45.

138. U.S. NOAA, 1993, 26.

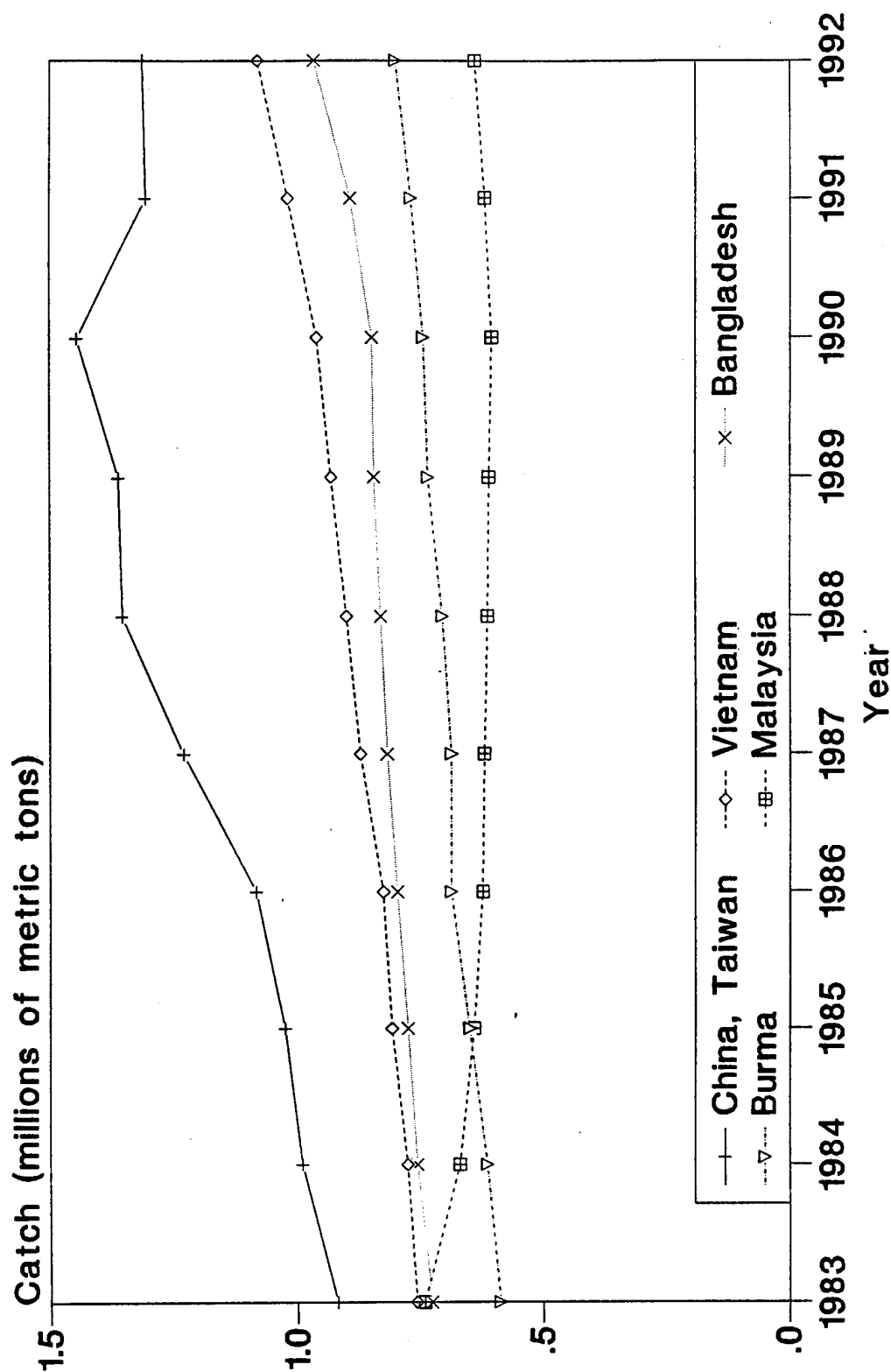
139. U.S. NOAA, 1993, 38.

**Figure 30. Fish catches, Asia-Pacific moderate catch countries: 1983-1992**



Source: FAO, 1994a, 533-535.

**Figure 31. Fish catches, Asia-Pacific small catch countries: 1983-1992**



Source: FAO, 1994a, 533-536.

the number of distant-water vessels rose 39 percent from 1985 to 1990, then dropped by 10 percent from the peak in 1990 (table 19).

Distant-water fishery catches are now larger than coastal and offshore fisheries because the latter are severely depleted.<sup>140</sup> Taiwan is experiencing some of the same problems in maintaining its distant-water fisheries industry as Japan and South Korea, in particular a shortage of domestic labor that is resulting in increased use of foreign workers.<sup>141</sup> Taiwan has also been hit by overfishing in some areas and increasing restrictions on access to fisheries under the control of other countries.

### **India**

With the third largest catch in 1992 among Asian countries and the seventh largest in the world, India is one of the countries still experiencing growth in its fish catch (figure 30). The two major Indian Ocean regions identified by FAO are the only major fishing areas that are still showing a rise in catches. India accounts for nearly half of the catch in the western Indian Ocean and over one-fifth in the eastern Indian Ocean. Increases in catch are reported in pelagic (top-feeding) species, with declines in some (e.g., mackerel) offset by increases in others (e.g., oil sardine and anchovy).<sup>142</sup> Demersal finfish also increased, led by increased catches of croakers.<sup>143</sup> Shrimp resources in the Western Indian Ocean are considered heavily exploited, with stable catches resulting from increases in smaller, less valuable species offsetting declines of larger species.<sup>144</sup>

### **New Zealand**

Increased overall catches (table 20) hide the fragile status of some of New Zealand's most important fisheries. The orange roughy is now considered fully exploited, and measures must be taken to prevent

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140. U.S. NOAA, 1993, 121.

141. U.S. NOAA, 1993, 125.

142. FAO, 1994b, 50.

143. FAO, 1994b, 50.

144. FAO, 1994b, 50.

the collapse of this fish resource. The orange roughy can live up to 100 years and matures at about 20 to 25 years. The fish are caught when they spawn, and the fear is that the impact of overfishing will not be completely evident for another 20 years when the current hatchlings become mature. Some observers estimate that some areas have been reduced to 10 to 50 percent of their virgin biomass.<sup>145</sup>

There is also evidence of overfishing of snapper. The blue grenadier catch increased rapidly in the late 1980s, but stocks are down, and the total allowable catch (TAC) was reduced by one-fifth to 200,000 metric tons in 1990-91.<sup>146</sup>

New Zealand has instituted some strong fishing regulations consisting of individual transferable quotas (ITQ) and TAC. Foreign fishing in New Zealand waters is now restricted by the Quota Management System (QMS) inaugurated in 1991. The QMS allows only New Zealand companies and/or citizens to own fishing quotas, with foreign investment in companies limited to 24.9-percent ownership. The quota holder may use its own vessels or charter foreign vessels to catch the fish the New Zealand company owns. Such chartered foreign vessels are responsible for about 60 percent of the catch in the New Zealand exclusive economic zone (EEZ).<sup>147</sup>

#### **Australia**

Australia is also still enjoying increasing total catches (table 20), but the gemfish, redfish, and ocean perch are probably overexploited.

#### **Sri Lanka**

Sri Lanka recorded the fourth largest catch in 1992 in the western Indian Ocean, a total of 185,000 metric tons (table 20). This represents a recovery to the 1983 level from reduced catches during 1984-1990 that resulted in part from civil disturbances in the country.

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145. FAO, 1994b, 66.

146. FAO, 1994b, 64.

147. U.S. NOAA, 1993, 17-18.



### **Thailand**

Thailand reported the ninth largest catch worldwide, the largest in the eastern Indian Ocean, and, until 1992, the largest in the western central Pacific (figure 30 and table 20). Catches have generally been slowly rising, although the 1992 catch was about 4 percent below the 1991 level. Thailand is one country trying to defuse conflicts between artisanal and trawl fishermen by constructing artificial reefs to provide new fishing areas for use by the local fishers.<sup>148</sup> Thailand is using most of the shrimp bycatch for fishmeal to support aquaculture production.

### **Malaysia**

Malaysia's recent peak catch was recorded in 1983 (table 20). Malaysia is another country trying to defuse conflicts by constructing artificial reefs. It has done the best job of fishery management among developing countries in the region through trying to control the amount of fishing that takes place in order to prevent overfishing.<sup>149</sup>

### **Burma (Myanmar)**

Burma recorded the third highest catch in the eastern Indian Ocean in 1992 and, like other countries fishing in this area, is still experiencing rising catches (figure 31 and table 20). Catches are linked to the monsoon cycle, with higher catches prior to the monsoon season.

### **Indonesia**

With the fourth largest catch in the eastern Indian Ocean area and the eighth largest catch in the world in 1992, Indonesia is still recording increased catches (figure 30 and table 20). One of the major types of fish captured by Indonesian fishers is the longline tuna, which continues to show increased catches.

### **Philippines**

The Philippines has shown modest increases in catch over the past 9 years, averaging 1.5 percent per year, although the 1992 catch was

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148. FAO, 1994b, 54.

149. FAO, 1994b, 55.

slightly lower than that in 1991 (figure 30 and table 20). The Philippines ranks third in the world in per capita seafood consumption at 34 kg (table 21). As noted above, this constituted 50 percent of the protein from animal sources; so the Philippines, with its shaky economy and high population growth, is probably the most vulnerable to major food problems should its fish production start to decline.

## Water supply

Rising demand for water, coupled with increasing pollution and exhaustion of available water sources, points to the possibility of serious water crises in the near future. Combining this with the fact that water resources often straddle international boundaries is a prescription for international tension and conflict.

Increasing demand for clean water is required for three human needs: household and domestic (under 10 percent), industrial (about 25 percent), and agricultural (about 65 percent).<sup>150</sup> Increasing populations require more water to maintain past levels of consumption for drinking, cooking, and cleaning. In addition, as countries develop, there is demand for more water per capita and for cleaner water. The industrial growth that fuels development also requires increases in water inputs. Finally, a major factor in increasing yields in agriculture is the increase in land under irrigation, as noted above. Water demand in India has been projected to increase by about 86 percent from 1985 to 2025,<sup>151</sup> and there are already signs of water scarcity in parts of India.

Signs of potential water shortages in Asia include:

- Because of increasing difficulty in obtaining water supplies, the cost of providing water to Shenyang, China, is projected to increase from \$0.04 to \$0.11 per cubic meter between 1988 and 2000.<sup>152</sup>

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150. Approximate global figures from Postel, 1992, 19-20.

151. Brandon and Ramankutty, 1993, 140.

152. Brandon and Ramankutty, 1993, 142.

- The water table in parts of Karnataka, India, has fallen from 8 meters below the surface in 1946 to 48 meters in 1986, and similar changes have been observed in parts of China.<sup>153</sup>
- Saline intrusion into groundwater has become a problem in many coastal cities, especially Bangkok, Manila, Jakarta, and Madras.<sup>154</sup>

Engelman and LeRoy<sup>155</sup> discuss relative levels of annual per capita water supply. Countries with availability of less than 1,000 cubic meters per person per year are considered water-scarce, while those with levels between 1,000 and 1,700 are considered under water stress. Based on these criteria, in 1990 the only countries in the Asia-Pacific Region in either category were Singapore (221 cubic meters per person), which is water-scarce, and South Korea (1,452 cubic meters per person), which is water-stressed. These national figures hide substantial variations in water availability within countries.

A byproduct of this demand for water fueled by population and development is increasing water pollution. "Water pollution is the most widespread environmental problem in Asia."<sup>156</sup> It results from the three areas of usage noted above:

- The lack of adequate sewage systems for households results in sewage containing human waste being directed into local rivers and streams.
- Industrial production often produces toxic waste products that are dumped into water supplies.
- Agricultural production results in the runoff of fertilizers and pesticides into nearby streams.

Usually, the initial approach to handling water pollution is simply to search for new sources of clean water, often requiring the piping of

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153. Postel, 1992, 35-36.

154. Brandon and Ramankutty, 1993, 22.

155. Engelman and LeRoy, 1993.

156. Brandon and Ramankutty, 1993, 21.

water over large distances. For example, the water intake has been moved more than 40 km upstream in Shanghai.<sup>157</sup> As demand for water from all sectors increases, this becomes less possible, and as the distance needed to transport the water increases, the cost of water rises.

Attempts to control rivers can also cause problems. The damming of rivers can result in benefits from hydroelectric power and more controlled flow of the river. However, these benefits are often obtained with many costs in addition to those for construction. Populations in the areas that will be flooded by the dam must be relocated and provided with housing and jobs. Reduced flows in some areas may cause problems, including changes in sedimentation and saline intrusion, and reservoirs can increase health risks due to water-borne diseases.<sup>158</sup> The global average number of dam projects per year has declined by half in the past decade compared to the previous 25 years. This is in part because there are fewer places where cost-effective projects could be placed. The first dams built were those in the areas that could get the maximum benefit from the costs of the project, so that water projects are now becoming more expensive and complex.<sup>159</sup>

The impact of water-control projects is particularly important when another country must deal with the results.<sup>160</sup> Although agreement on the Indus Basin Treaty was reached in 1960, planning since then has been pursued independently by India and Pakistan.<sup>161</sup> The Ganges-Brahmaputra basin has been subject to even less cooperation, with India and Bangladesh independently proposing markedly different projects.<sup>162</sup> Diversion of Ganges water to the Hooghly River by India's Farakka Barrage has caused concern about low water flow in

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157. Brandon and Ramankutty, 1993, 142.

158. Brandon and Ramankutty, 1993, 145.

159. Frederick, 1993, 6-8.

160. Frederiksen, Berkoff and Barber, 1993, 57-58.

161. Frederiksen, Berkoff and Barber, 1993, 57-58.

162. Frederiksen, Berkoff and Barber, 1993, 58.

Bangladesh.<sup>163</sup> As water becomes more scarce, these tensions could develop into military skirmishes or worse.

Water treatment in many parts of the region is only in its infancy. For example, in India only 8 of 3,119 towns and cities have full sewage treatment facilities, and another 209 have partial treatment.<sup>164</sup> Data from the United Nations show high levels of sewage contamination in Asian rivers, with levels of fecal coliform contamination five times the maximum level to be classified as polluted.<sup>165</sup> Evidence of industrial pollution is indicated by median sampled levels of mercury at 200 times the recommended standard.<sup>166</sup>

In summary, the ability to supply clean water will be hampered in the future by limited availability of water, its quality, and the increasing demand for water for agricultural, industrial, and household use, fueled by population growth and economic development.

## Country-specific assessments

### China

Although not classified as water-scarce or stressed, China's uneven distribution of water supply, population, and economic growth has resulted in many areas with water problems—"200 major cities already lack adequate water, and a fourth of them face acute shortages."<sup>167</sup>

China often suffers the dual problems of floods in some areas and droughts in others; during 1994 these difficulties affected nearly one-fifth of the agricultural land.<sup>168</sup> The resulting disruptions caused an unusually large exodus of migrant laborers looking for work,

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163. Postel, 1992, 83.

164. Brandon and Ramankutty, 1993, 49.

165. Brandon and Ramankutty, 1993, 48.

166. Brandon and Ramankutty, 1993, 48.

167. Engelman and LeRoy, 1993, 33.

168. Kaye, 1994, 24-25.

clogging transportation routes. In some areas they have rekindled ancient feuds, resulting in one case in the dynamiting of a bridge to form a makeshift dam. By June of 1994, "some 300 cities out of over 570 cities in China are suffering from shortage of water with 50 in the very serious state of water supply, provoking a severe restraint to the economic development of the country."<sup>169</sup> Officials pointed to the importance of water conservation efforts, including the prevention of leaks in toilets and cisterns.

China is trying to control some water supplies and increase the production of clean hydroelectric power with the construction of the Three Gorges Dam. It is hoped that the dam will reduce the problems caused by periodic flooding of the Yangtze River. However, there is intense criticism of the project from Chinese and international sources. Some fear that the dam is too large (it will be the world's largest) and that, if it should fail, it could repeat the disastrous collapse of two dams in 1975 that may have killed thousands of people.<sup>170</sup> Others criticize the astronomical cost of about \$30 billion and the displacement of over one million people from the area that will be flooded.<sup>171</sup> Those who will be displaced will receive some compensation, but some farmers are being forced to give up prime agricultural land for less fertile areas; and there is concern that there may be violent protests by those who are displaced.<sup>172</sup>

Supporters of building the dam note its importance for electricity generation. Some observers project that China, with its very high rate of economic growth, would need to add 17,000 megawatts of electrical generating capacity each year in the late 1990s to meet demand. The Three Gorges Dam, with its estimated capacity to generate 18,200 megawatts, would satisfy one annual increment to national demand, but the dam is not scheduled to begin power generation until 2003 at the earliest, with completion set for 2009.<sup>173</sup>

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169. Zhongguo Xinwen She, June 6, 1994.

170. Mufson, 1995.

171. Burton, 1994, 62.

172. Youngblood, 1995 and Mufson, 1995.

173. Tyler, 1994; and Burton, 1994, 63.

International doubts about the project are reflected by the refusal of the World Bank to back the project.

### India

Water distribution varies widely in India, much like China, and some areas are already in the scarcity category.<sup>174</sup> For example, the state of Rajasthan in northwest India has annual per capita water availability of 562 cubic meters, near the level of absolute scarcity. Based on UN population projections, India as a whole could become water-stressed by the year 2025.<sup>175</sup>

A major water dispute has erupted in the 1990s with the construction of the Farakka Barrage that diverts Ganges water to flush the Calcutta port.<sup>176</sup> Bangladesh prime minister Begum Khaleda Zia told the UN General Assembly that "unilateral withdrawal of the Ganges water by India in complete disregard of the interests of the people of Bangladesh had brought over 40 million people face to face with catastrophic disaster."<sup>177</sup>

Since 1989 there has not been a water-sharing agreement between India and Bangladesh; India agreed in 1977 to let Bangladesh take a guaranteed minimum of 34,000 cubic feet per second (cusecs) of water from the Ganges during the dry season from October to June, compared to India's 23,000 cusecs, but that minimum was eliminated in a 1982 water pact, which expired in 1988.<sup>178</sup> In late April 1994, the flow of Ganges water dropped to an all-time low of only 9,500 cusecs compared to 73,500 at the same time in 1978. Anger over the impact of the Farakka Barrage on Bangladesh sent thousands of protesters to the streets of Dhaka, smashing at least 30 vehicles. Bangladesh claims that the water diversion has turned large parts of the country into desert, reduced agricultural production, increased salinity in some

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174. Engelman and LeRoy, 1993, 24.

175. Engelman and LeRoy, 1993, Appendix 3.

176. Agence France Presse, Oct. 14, 1993.

177. Reuters Library Report, Oct. 14, 1993.

178. Ahmed, 1994.

rivers, reduced production of freshwater fish, and dried up navigable rivers.<sup>179</sup> The two countries are trying to negotiate a new water sharing agreement, but in the meantime India has plans to build a second barrage on the Ganges at Kanpur.<sup>180</sup>

In other areas, water experts from India and Nepal are talking about cooperation to control the flow of the Kosi River, which causes devastating floods in the Indian state of Bihar.<sup>181</sup> India has ignored efforts for regional water talks, preferring bilateral agreements, but India and Nepal have not had a joint river project since the 1960s.

### **Bangladesh**

In addition to the water disputes with India, the major water problem is controlling the monsoon floods that hit each summer. The government is proposing a series of embankments, dams, and diversions to control the rivers, but opponents argue it will decrease the fertility of the soil and keep fish out of their breeding grounds.<sup>182</sup>

### **Mekong River**

In contrast to the tensions between India and Bangladesh over shared water resources, Thailand, Laos, Cambodia, and Vietnam, with assistance from the United Nations Development Programme (UNDP), have agreed to jointly develop the lower Mekong River.<sup>183</sup> The Mekong is the twelfth longest river in the world and the largest freshwater resource in Southeast Asia.<sup>184</sup> The agreement provides for the "reasonable and equitable use" of the waters of the Mekong River. Planned projects include "irrigation, hydro-power generation, navigation, flood control, fisheries, timber floating, recreation and

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179. Thomas, 1994; and Ahmed, 1994.

180. Reuters World Service, Mar. 11, 1994 and Jan 26, 1995.

181. Bhattarai, 1993.

182. Hossain, 1993.

183. Tunsarawuth, 1995.

184. UNDP, Dec. 19, 1994.



tourism..."<sup>185</sup> The door has been left open for China and Burma to join in the agreement since they share the upper Mekong River.<sup>186</sup>

### **Vietnam**

As an indication of the types of work that may be needed on the Mekong River, flooding in 1994 caused 175 deaths in one month, and was the worst since the 1960s.<sup>187</sup> These floods resulted in property damage and crop losses totalling \$60 million.

### **Thailand**

Water pollution is a major concern in Thailand.<sup>188</sup> The importance of the tourism industry is forcing the country to try to clean up some areas so that tourists are not turned away by dirty sea water in the resorts. One area of water dispute is the conflict between farmers and golf courses in the country.<sup>189</sup> Thailand is facing water shortages in many areas. The localized dearth of water is thought to be due in part to the loss of forests, and water rationing has been implemented in Bangkok.<sup>190</sup>

### **Malaysia**

Malaysia has been struck in recent years with water shortages in some areas, causing dry taps in Malacca and the suspension of irrigation water.<sup>191</sup> In other places, floods are still a problem, in spite of government efforts to control them.<sup>192</sup> Malaysia is trying to find solutions to water pollution problems resulting from oil spills, desludging, waste

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185. UNDP, Dec. 19, 1994.

186. Kyodo News Service, Feb. 28, 1995.

187. Agence France Presse, Oct. 9, 1994.

188. Mallet, 1993.

189. *Bangkok Post*, May 17, 1993.

190. Ling, 1994.

191. Ling, 1994.

192. *Straits Times*, Nov. 21, 1993.

dumping, and siltation.<sup>193</sup> Malaysia has proposed a traffic separation scheme for the Straits of Malacca to increase safety and environmental protection.

#### **Indonesia**

Indonesia fears a serious water-scarcity problem in the next three to five years in its two largest cities, Jakarta and Surabaya.<sup>194</sup> The heavy use of underground water, at three times the replenishment rate, is causing major problems of pollution and salt-water intrusion and cannot continue indefinitely.

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193. Sadiq, 1993.

194. Richardson, 1994.

# Key findings and conclusions

Some general conclusions flow from this report; other insights are more relevant to particular countries.

## Overview

### Population and social trends

- Population growth continues in all countries of the Asia-Pacific Region, necessitating production increases in all sectors of national economies just to maintain per capita living standards. Those developing countries with highest population growth rates tend to have the lowest annual increases in per capita GNP.
- Asia has the world's most densely populated large cities, with air pollution already extreme and rapidly worsening.
- Large proportions of most Asian populations are in the young-adult ages. Unemployment is greatest in this age group, yet their expectations are higher than those of previous generations because of higher literacy and educational attainment, and because of the revolution in communication.
- Access to television has grown dramatically in most Asian countries. Programming from developed and newly industrialized countries highlights the chasm in living standards between poor and rich countries. At the same time, a pan-Asian consciousness may be developing out of shared television programming.
- In Asia, rapid population aging looms as a problem over the next 15 years only in Japan.

## **Ethnic and religious divisions**

- Some observers see Asia as relatively benign in its relations between different national, religious, cultural, and language groups. But many ethnic or religious conflicts continue to fester and cannot be considered overcome or solved. Continuing discrimination against certain minority groups and occasional future explosive confrontations are likely.
- Where religious or ethnic hatreds are most pronounced among the population or fanned by a government, frequent unrest or separatist movements are already facts of life. Such turmoil is slowing the modernization and economic transformation of several APR countries, particularly in South and Southeast Asia.
- Some Southeast Asian governments tend to discriminate against their ethnic Chinese minority, while the majority populations of some countries envy and resent the Chinese among them. This may have few international consequences if China's government feels little identity with the overseas Chinese or avoids interfering to keep good relations with other governments.

## **Health and mortality**

- Death rates are now low in Asia, but catastrophic mortality has been caused and will sometimes be caused in the future by civil and international wars, oppressive government policies, and natural disasters. Today, the world tends to learn of these cataclysms as they are happening, and pressures to intervene for humanitarian reasons can be enormous.
- The HIV/AIDS epidemic is spreading rapidly among the general population in Thailand, in coastal areas of India, in Burma, and possibly in Cambodia.
- Rates of HIV infection are escalating quickly among intravenous drug users in South and Southeast Asia, and in China near the border with Burma.

- HIV infection has not been detected among female prostitutes in most East Asian and some Southeast Asian countries, but high HIV seroprevalence is found among commercial sex workers throughout Thailand and in the capital city and coastal cities of India. The main mode of transmission of the Asian HIV/AIDS epidemic is now commercial sex. Internal and international migration of workers and tourists is spreading the epidemic beyond the core affected countries.
- In Asian countries with severe AIDS epidemics, death rates among children and working-age adults are projected to multiply in the coming decade or two. Widespread illness will divert resources from development and greatly reduce the productivity of infected individuals and their caretakers.

### **International migration**

- Most recorded international migration in Asia consists of contract workers sent to the Middle East. They send sizable remittances to their families at home.
- In recent years, almost half the legal immigrants to the United States, Canada, and Australia have been Asians.
- Legal and illegal labor migration has been increasing within Asia, mostly from poorer countries to developed and newly industrializing countries.
- International transport has become more available, easier, and cheaper, which facilitates the flow of illegal international migrants.
- Most of Asia's refugee problems of recent decades are now subsiding, but certain countries such as Sri Lanka, Burma, and Bangladesh have generated new flows of refugees to nearby countries in the early 1990s.

### **Population and food**

- Recent trends indicate reductions in per capita global production of some important food sources, notably grain and fish.

This could lead to increased competition for available food supplies.

- Most countries of the Asia-Pacific Region are not getting the maximum potential yield of grains from their cropland. Thus, they have the potential to increase food production to feed their growing populations by expanding irrigated area, increasing fertilizer use, and/or using high-yielding seeds more systematically.
- Projections of grain needs and net grain imports for the Asia-Pacific Region vary widely, depending on what organization is assessing the situation. Most view the situation as manageable in the coming decades; one group sees China demanding more grain from the international market by 2030 than can be supplied.
- China's economy is one of the fastest growing in the world. With rising living standards, China's people are diverting ever more valuable cropland to houses, cities, factories, and roads while at the same time eating more meat. Even if China demands rapidly increasing imports of food and feed to supply its more numerous and more prosperous population, the land-rich countries of the world could pull fallow land into production and meet the demand in the medium-term future.
- Shipments of more bulk cargoes of grain and other feed and food products will increase maritime traffic.
- Many Asian countries depend heavily on fish for their protein supplies. Overharvesting of fish has increased competition for fishing grounds and could lead to international conflict over fishing rights. Total fish catch is declining in all parts of the Pacific.
- As more fish is desired but the fish catch declines, APR countries could follow China's example and develop aquaculture to make up the shortfall in fish supplies. Fish farming requires feed for the fish and can cause serious water pollution problems if not carefully managed.

- Increased demand for water and increased water pollution are putting a strain on the available supplies of fresh water. Tensions could easily result from competition for water resources shared by several countries. Although the countries of the lower Mekong River have agreed to cooperate in developing and sharing Mekong water resources, in other areas there is conflict over water. For example, India is diverting water before the Ganges River reaches Bangladesh, causing a crisis between the two countries.

## Country profiles

### Northeast Asia

#### North Korea

The population of North Korea is 24 million, just over half the size of the population of South Korea, 45 million. North Korea's population is now growing at less than 2 percent a year, because fertility has declined to somewhat over 2 births per woman. Child dependency is low. The proportion of the population ages 15-24 is high now but will drop rapidly in the coming years. The country is closed and the economy is reportedly in bad shape. A steady fish catch by North Korea has been reported from the Northwest Pacific since the mid 1980s.

#### South Korea

South Korea's population is growing slowly, only 1.0 percent a year. It has urbanized rapidly in recent decades, and now 81 percent of the population lives in urban areas. A high proportion of the population is in the working ages, and there is low child dependency and aged dependency. Since the early 1980s, the outflow of migrant workers from South Korea has greatly diminished. Between now and 2010, the working age population will increase as a proportion of the total population, while the elderly proportion of the population will increase from 6 percent to 10 percent, and child dependency will be further reduced. The "youth bulge" will diminish in coming decades. Per capita GNP is high and has been growing rapidly for decades. Food production per capita has been increasing at an average of 0.8

percent a year during 1979-92. Seafood consumption is unusually high in South Korea. Its fish catch has recently been steady. The availability of water per capita is problematic enough that South Korea is classified as a water-stressed country.

### **Mainland China**

China is the world's most populous country, with a population of 1.2 billion in 1996 and now growing at only 1 percent a year. The child dependency ratio is low. Public expenditures on education as a percent of the rapidly rising GNP declined between 1980 and 1990. The percent of the population in the young-adult ages 15-24 is declining rapidly. Enrollment in secondary and higher education is still growing.

Half of China's population is in the working ages past entry level (ages 25-64), and this proportion will rise in the coming decades. Because China has one of the fastest growing economies in the world, one might conclude that the economy could employ this large and growing working-age population in productive endeavors. But, unfortunately, China has a huge surplus of laborers in agriculture and the state industrial sector, totaling between 80 million and 220 million workers. In addition, during the 5-year period 1995-2000, there will be a net increase of 69 million people in the age group 25-64. Yet in the past 5 years of extraordinarily rapid economic growth, China's economy generated a net increase of only 59 million jobs, of which only 41 million were outside of agriculture. Therefore, it is unlikely that the China mainland will be able to absorb its huge backlog of unproductive workers into useful work in the near- and medium-term future.

China's booming economy is growing unevenly, and millions of laborers are attempting to move to where there might be jobs. Some are migrating illegally to the developed or newly industrializing countries such as those in Northeast Asia.

For decades, the Chinese government has blocked most movement of rural people out of agriculture into other work or into urban areas. The agricultural labor force kept increasing from the early 1960s to the 1990s. Now, China has almost 5,000 agricultural workers per 1,000



hectares of cropland, in contrast to Vietnam with 3,000, Bangladesh with over 2,000, and most APR countries with about 1,000 agricultural workers per 1,000 hectares of cropland.

Agriculture in China is intensive. China has only 0.1 hectare of cropland per capita. To grow enough food, China has increased irrigated area until it is almost half of all cropland. Fertilizer use has skyrocketed in China since the early 1970s, and is now 300 kg per hectare, in contrast to 100 kg/ha in Indonesia, Vietnam, and Bangladesh.

Yields of total cereals in China are higher than in any APR country except Japan. China's yields of paddy rice are approaching Japanese levels. China's wheat yields are far higher than in India, the other major wheat producer in the APR developing countries. Corn yields in China are far higher than in Thailand or the Philippines.

The economic reform period since the late 1970s has resulted in greatly increased per capita calorie supply for China's people and greatly improved protein supply that puts China ahead of most large APR developing countries. The Chinese people eat only 6 kg of seafood per capita per year. China's fish catch from the Northwest Pacific (including fish farming) has increased each year since 1983 and is now 8.7 million metric tons, a larger total catch than Japan's. China leads the world in aquaculture production. Future increases in fish supply are projected to come mostly from greater aquaculture production.

Whether China will be able to feed its growing population in the coming decades is a controversial subject. The Worldwatch Institute projects that loss of agricultural land to development will reduce China's total grain production so much by 2030 that the world market will be unable to make up the shortfall. USDA, the World Bank, and FAO all are much more upbeat about China's food production prospects. They project China's net import needs to be manageable in the coming 15-year period.

Agriculture appears more intensive in China than in most other Asian countries, though China's data on cropland are somewhat suspect. China has less slack in its food production system than other APR countries. Limits on yields may have been reached or may soon

be reached, given current technology. Besides, China is facing water constraints in agriculture in the future, especially in north China. Therefore, the current losses of rich farmland to modernization, combined with increased demand for meat, may require increased net imports of food and feed grains. This would not be a crisis. Major grain-exporting countries could move fallow land into production for the China market if world grain prices rose enough to make it worthwhile.

In short, demographic, economic, and subsistence prospects for China appear good in the coming 15-year period.

## **Southeast Asia**

### **Philippines**

The Philippines has a population of 74 million people, still growing at 2.3 percent a year. Fertility has begun to decline. The child dependency ratio is high. Public expenditures on education are increasing rapidly. The Philippines has high growth rates of enrollment in secondary and higher education. There is a bulge in the age structure in the late teens and early twenties. Levels of unemployment are high for the total labor force (males: 7 percent; females: 10 percent), but much higher in the 15-19 age group (males: 12 percent; females: 16 percent), and worse yet at ages 20-24 (males: 14 percent; females: 21 percent).

This serious level of unemployment fuels worker migration from the Philippines. A large portion of immigrant admissions to the United States, Canada, and Australia are from the Philippines. Annually since the early 1980s, the Philippines has sent out more migrant workers than any other APR country by a huge margin. In most APR countries that receive Filipino migrants, there may be more illegal than legal migrants. Worker remittances are a major source of foreign income and foreign exchange for the Philippines. Though the HIV/AIDS epidemic has only begun to infect commercial sex workers in the Philippines, and there is no evidence showing its spread in the general population, there is concern that some workers returning home to the Philippines may have become infected abroad and may spread the virus at home.

In contrast to most APR countries, the Philippines had declining per capita income during the 1980-1992 period. The size of the agricultural labor force per unit of cropland is comparatively small. The available cropland per capita is much lower than in Thailand or India, about the same as in Indonesia, and higher than in Vietnam or China. Cereal grain production per capita has been increasing slowly. Irrigated area has been increasing, and is now about 20 percent of cropland. Fertilizer use is quite low. Yields of cereal grains (rice and corn) are also quite low. Per capita calorie supply is similar to that of Thailand, Vietnam, and India. Per capita protein supply is low but rose after 1987.

Seafood consumption per person is high in the Philippines—34 kg per person per year—ranking third among all major countries and constituting half of all animal protein consumed there. The fish catch has not increased much during the past decade and has been steady in the early 1990s.

The USDA projects a small increase in net grain imports by the year 2000. The Philippines has the potential to grow more food, given that its current yields of staple grains are low.

### **Indonesia**

Indonesia is the world's fourth most populous country, after China, India, and the United States. Fertility has declined, and the population is now growing at one and a half percent a year. Three million people are added to the population annually. The built-up area of Jakarta is about the fourth densest in the world.

The child dependency ratio is now moderate. There is still a bulge in the young-adult age groups of the age structure, and unemployment is high at ages 15-24, while reportedly being low for the labor force as a whole. Educational enrollments at secondary and higher levels are rapidly increasing. The early 1990s saw a big jump in the annual numbers of migrant workers reported leaving Indonesia. There are thought to be at least a half million illegal migrant workers from Indonesia working in agriculture and construction in Malaysia, mostly men who circulate regularly back to their homes.

Indonesia's economy grew at a healthy clip during the 1980-1992 period—about 4 percent a year annual per capita GNP growth. Indonesia's agricultural labor force is not nearly so densely crowded on its cropland as is the case in Bangladesh, Vietnam, or China. Per capita production of cereals grew at 4 percent a year during the late 1970s and early 1980s; the annual increase declined to one and a half percent a year in the late 1980s. Per capita cropland is much lower than in Thailand or India, about the same as in the Philippines, and higher than in Vietnam or China. Irrigated area grew rapidly in the 1980s; almost 40 percent of Indonesia's cropland is now irrigated. Fertilizer use is far lower than in China, about the same as in Vietnam and Bangladesh, and higher than in India, the Philippines, or Thailand. Yields of total cereal grains are almost as high in Indonesia as in China, but yields of paddy rice are lower in Indonesia than in China.

Per capita calorie supply is almost as high in Indonesia as in China today; both Indonesia and China rank well ahead of the Philippines, Thailand, Vietnam, India, and especially Bangladesh. Per capita protein supply in Indonesia is about the same as in India but much less than in China. Indonesians eat a moderate amount of seafood—14 kg per capita per year. Indonesia's fish catch has been increasing steadily in the western central Pacific and the eastern Indian Ocean.

Currently, Indonesia has small net imports of grains, 2 to 3 million metric tons (mmt) a year. Increased imports are projected. The USDA projects net imports in the range 2 to 8 mmt in the year 2000. The World Bank projects net imports of 6 mmt in 2000 and 8 mmt in 2010. These quantities are manageable on the world market.

Indonesia is experiencing some labor unrest, with workers demanding more than the below-the-legal-minimum wages being paid. Radical Islamic fundamentalists could pose a threat to domestic order if they were able to exploit an economic downturn, or other source of popular dissatisfaction, to foment confrontation between Islamic groups or between Muslims and non-Islamic elements of the population. Continuing resentment of the small Chinese minority erupts periodically into localized violence. Separatist sentiment exists in some areas. There is no guarantee that these potential sources of unrest will be contained in the future.

## **Vietnam**

Vietnam is the world's 13th most populous country. The population is still growing at almost 2 percent per year, but fertility is declining and the population growth rate is projected to decrease. The built-up area of Ho Chi Minh City (formerly Saigon) is very densely populated.

Vietnam's child dependency ratio is still high. Literacy and primary educational attainment are high among the children of Vietnam. Secondary and higher educational enrollments are increasing rapidly. There is a bulge in the population age structure at ages 15-24, with high unemployment in the 15-19 age group that drops much lower at ages 20-24. It is thought that unemployment in Vietnam today is much higher than it was in 1989 when the census recorded unemployment.

Vietnam generated millions of refugees and economic emigrants from when the civil and international war ended in the mid 1970s until today. The United States and other developed countries accepted most refugees from Vietnam who had fled to nearby countries of first asylum, usually by boat. China accepted a quarter of a million ethnic Chinese refugees from Vietnam. Since 1989, receiving countries have arranged to accept Vietnamese emigrants almost exclusively through the Orderly Departure Program. Flight by boat has now almost ceased, because migrants know they will not be accepted and are likely to be repatriated to Vietnam. Countries where Vietnamese are still living in refugee camps plan to repatriate most of them to Vietnam and close the camps.

Contract workers from Vietnam dropped to a very small number in the early 1990s. Earlier Vietnamese guest workers in eastern Europe and the former Soviet Union were sent home when Communism collapsed, though thousands have managed to stay in Europe—in Germany, for instance. Many Vietnamese workers came home from the Middle East when Iraq invaded Kuwait. Vietnam's government did not send them out again. The returnees have contributed to an increase in unemployment.

The density of Vietnam's labor force on its cropland is second only to China's in the APR. In the Red River Delta of northern Vietnam, population density has been so high for so many decades that malnutrition there has been a problem for much of this century. Vietnam's government has been relocating families from the Red River Delta to rural areas called New Economic Zones to even out rural population densities and till new land. Vietnam has almost as little cropland per capita as China and Bangladesh.

In the 1980s, Vietnam had rapid growth in per capita production of cereal grains. Irrigated area has been increasing and now is almost 30 percent of cropland. Fertilizer use per hectare has been rising in the 1980s and early 1990s, and is now about the same level as in Indonesia and Bangladesh, but still far below China's. Yields of total cereals are higher than in most APR countries but below yields in Indonesia and China. Vietnam is a net exporter of grain, and this is projected to continue. Per capita calorie supply is similar to that in Thailand, India, and the Philippines, but well below China's and Indonesia's. Per capita protein supply is well above Bangladesh's and Thailand's but below that of the Philippines, Indonesia, India, and China. The people of Vietnam eat a moderate amount of fish—12 kg per capita per year. The fish catch has been increasing in recent years.

#### **Thailand**

Thailand's population of 59 million people is growing at just over 1 percent a year. Its child dependency ratio is now comparatively low. It still has a bulge in the age structure at ages 15-24.

Thailand's economy grew rapidly in the 1980-1992 period, with the annual increase in per capita GNP averaging 6 percent. It has more cropland per capita than any other major APR country, and low density of agricultural workers on the cropland. Irrigated area has been increasing and is now about 20 percent of cropland. Fertilizer use is low and grain yields are low. Paddy-rice yield is lower than in the other APR countries. Corn yields are much lower than in China but much higher than in the Philippines. Thailand is a net grain exporter and is expected to remain so.

Per capita calorie supply is about the same as in the Philippines, Vietnam, and India. Per capita protein supply is comparatively low, but the Thai people consume a rather large amount of seafood—22 kg per capita per year. Thailand's fish catch has been declining in the western central Pacific but increasing in the eastern Indian Ocean.

Thailand would be in reasonably good shape socially and demographically if it were not for the rapidly spreading HIV/AIDS epidemic. The epidemic reportedly started in the homosexual community, spread to intravenous drug users, and then increased among prostitutes. Commercial sex is now HIV's route into the general heterosexual population. Many rural and urban Thai men customarily frequent commercial sex workers from young adulthood. The proportion HIV-positive among young military recruits increased to 2 percent in two of Thailand's regions, 4 percent in the south, and 8 percent in the north by 1992. Among pregnant women, HIV seroprevalence levels rose to 1 percent in two regions, 2 percent in central Thailand, and 4 percent in the north by June 1994.

Migration of male workers within Thailand has helped to spread HIV around the country. International migration, especially of Thai prostitutes, threatens to spread the epidemic far beyond Thailand. The number of migrant workers recorded as leaving Thailand peaked in the late 1980s at almost 100,000 per year, then declined to 64,000 a year at the beginning of the 1990s. It is not clear how much of illegal international migration is captured in these figures.

The Thai government is waging an aggressive campaign to persuade or require commercial sex workers to use condoms at all times with their customers. There are some indications that HIV-positive rates may be leveling out among prostitutes in some areas. But the momentum of the HIV/AIDS epidemic is great. Thailand's death rates may rise sharply and the total population may even begin to decline. Illness and premature deaths among those now infected or soon to be infected will be costly for Thailand's health system and for the productivity of the Thai work force, as well as devastating for the affected families.

### **Burma (Myanmar)**

Burma has a population of 46 million, growing at almost 2 percent a year. It has high child dependency and a large proportion of the population in the young-adult ages. Several minority nationalities, religious groups, and ethnic groups constitute a total of over 30 percent of the population. Some opium-growing minority groups have been in revolt against the Burmese government for decades. In recent years, refugees have fled to Bangladesh and Thailand from Burma, claiming oppression of their Muslim religion or their tribal group.

Burma is poor and isolated. An HIV/AIDS epidemic has begun there, spread by intravenous drug users and by young Burmese girls who go to Thailand, become prostitutes, contract HIV, and then are sent home. The country lacks enough testing kits to test the blood supply and enough condoms to slow the spread of the epidemic.

### **Cambodia**

The Cambodian population is recovering slowly from the genocidal destruction of the Khmer Rouge period of the late 1970s. The population is very young and growing rapidly. The child dependency ratio is unusually high. Refugees have returned to Cambodia from Thailand, but many have been traumatized and crippled by warfare. Cambodia has the highest proportion of amputees to national population in the world, primarily because of land-mine explosions. The country is littered with land mines, and the work of clearing them is proceeding slowly. Meanwhile, the HIV/AIDS epidemic has reached commercial sex workers in Phnom Penh. No further information is available on whether the virus is spreading.

## **Indian Ocean/South Asia**

### **Sri Lanka**

Sri Lanka has achieved low fertility, reduced population growth, and a low child dependency ratio; however, its progress has been derailed for a decade by civil war between its majority Sinhalese and minority Tamil ethnic/religious groups. Tamil refugees are gradually returning to Sri Lanka from southern India where they took refuge from the conflict. Sri Lanka's age structure includes a bulge in the young adult



ages, which could be a continuing problem in combination with Sri Lanka's high unemployment rate. In the early 1990s, there was a sharp increase in the number of contract workers sent abroad.

### **Bangladesh**

Bangladesh is the world's most densely populated country, except for small city-states, and the tenth most populous country. The built-up area of Dhaka ranks as the third most densely populated urban area in the world. Population pressure on the land in the country is enormous and is breeding conflict over land use—for example, between Bengalis and hill tribal groups. Land-hungry migrants from Bangladesh have also moved into sparsely populated hill areas of north-eastern India, generating conflict with native tribes there. The population of Bangladesh is still growing at 1.8 percent a year. There is demographic progress; the fertility level recently declined to 4 births per woman, but the population of Bangladesh will continue its rapid growth for decades into the future. Catastrophic mortality levels occur in Bangladesh with a frequency unusual in the APR. The causes are, first, fierce cyclones, and, second, flooding of the rivers that flow into Bangladesh that is exacerbated by denuding of forests upriver from Bangladesh.

Bangladesh retains a high child dependency ratio and has increased its public expenditures on education in the last decade. Secondary and higher educational enrollments are increasing rapidly. An unusually high proportion of the population is in the late teens and early twenties.

The early 1990s saw a big jump in the numbers of international migrant workers leaving Bangladesh. Refugees from Burma fled to Bangladesh in the 1991-1993 period, but Bangladesh has also generated refugees that have gone to India.

Bangladesh has had an increasing agricultural labor force per unit of cropland in recent decades, which suggests an increasing surplus labor force in agriculture. The economy has been growing slowly at about a 2-percent annual increase in per capita GNP. Per capita production of cereal grains has increased at 1 percent a year in the most recent decade. Over 30 percent of the cropland is irrigated, and

irrigated area has been growing rapidly. However, fertilizer use and grain yields are low. Per capita calorie supply is lower than in most APR countries, and protein supply is also minimal.

Projections of net imports of grain for Bangladesh foresee slightly increased import needs by the year 2000 and much larger net imports by 2020 or 2030. Fish consumption per capita is low in Bangladesh—only 7 kg per capita per year. Bangladesh has had an increasing fish catch from the eastern Indian Ocean in recent years.

### **India**

India is the world's second most populous country, with a total population approaching one billion in the next few years. Its population is still growing at under 2 percent a year. Fertility has recently been declining, especially in southern states of the country, but 16 million people per year are added to India's population, much more than China's annual increment. The built-up areas of Bombay and Ahmadabad are among the top eight most densely populated in the world.

India retains a high child dependency ratio. Its public expenditures on education have been growing rapidly—especially secondary and higher educational enrollments. India has a “youth bulge” in the 15-24 age group, and underemployment of the work force is a serious problem.

India has an extremely diverse population. Clashes between Hindu and Muslim, between castes, and between other groups such as tribes are endemic. Frequent domestic unrest and conflict with Pakistan and Bangladesh weaken India politically and economically.

Hundreds of thousands of migrant workers left India in the 1980s, but data are unavailable for the 1990s. India is also one of the main sources of legal migrants to the United States, Canada, and Australia. India harbors refugees from Tibet, Sri Lanka, Bangladesh, and Afghanistan.

The HIV/AIDS epidemic is serious in India, especially among prostitutes in coastal cities and the capital city. It is now spreading to the general population in these regions. Migration within India and

internationally helps spread the epidemic, and, so far, India has not implemented a strong campaign to slow it.

India's economy had an annual growth in per capita GNP of about 3 percent a year during the 1980-1992 period. India is essentially self-sufficient in food grains, with slight net exports. Its agricultural labor force per unit of cropland is much lower than in China, Vietnam, or Bangladesh. India has more cropland per capita than most populous APR countries. Production of cereal grains per capita has increased at almost 2 percent a year in recent decades. Over one-quarter of its cropland is irrigated; irrigated area has been growing at 2 percent a year for two decades. Fertilizer use is low, and cereal yields are still quite low; this is true of both rice and wheat. India's per capita calorie supply is low, but not as low as in Bangladesh. Protein supply in India is better than in several other populous APR countries. The Indian population eats very little fish—only 3 kg per capita per year. India's annual fish catch is increasing.

Projections of India's future net trade in grains differ radically. The USDA projects no change by the year 2000. The World Bank projects net imports increasing to 14 million metric tons by 2010. Dyson projects that India will be a big net exporter of grain by 2020, while Worldwatch projects that India will have net imports of 45 mmt by 2030.

Our assessment is that India has great potential for increasing yields using current technology; there is much slack in the current system of agricultural production. India could remain self-sufficient in food in the coming decades.

## **Appendix: Data tables**

Table 1. Estimated and projected population for countries of the Asian-Pacific Region, by sub-region and country: 1985 to 2010 (midyear population in thousands)

Region or Country	1985	1990	1995	1996	2000	2005	2010
World	4,854,583	5,281,545	5,691,418	5,772,351	6,091,477	6,480,580	6,862,111
TOTAL ASIA-PACIFIC REGION	2,573,566	2,799,072	3,006,657	3,046,657	3,200,046	3,376,808	3,544,865
Percent of World	53.0	53.0	52.8	52.8	52.5	52.1	51.7
NORTHEAST ASIA	1,258,880	1,347,495	1,419,229	1,432,612	1,481,761	1,532,894	1,578,997
China, Mainland	1,052,924	1,133,710	1,198,063	1,210,005	1,253,438	1,298,431	1,340,357
China, Taiwan	19,337	20,279	21,274	21,466	22,214	23,124	23,966
Hong Kong	5,456	5,688	6,188	6,305	6,685	7,059	7,401
Japan	120,754	123,537	125,200	125,450	126,582	127,654	127,548
North Korea	19,602	21,412	23,487	23,904	25,491	27,137	28,491
South Korea	40,806	42,869	45,018	45,482	47,351	49,490	51,235
SOUTHEAST ASIA	404,730	444,486	485,954	494,117	526,458	566,201	605,123
Burma	37,319	41,078	45,135	45,976	49,388	53,757	58,236
Cambodia	7,399	8,731	10,561	10,861	12,098	13,787	15,679
Indonesia	171,934	187,728	203,459	206,612	219,267	234,876	249,679
Malaysia	15,546	17,507	19,550	19,963	21,610	23,645	25,691
Philippines	57,784	65,037	72,860	74,481	80,961	89,056	97,119
Singapore	2,703	3,039	3,333	3,397	3,620	3,845	4,026
Thailand	51,275	55,052	58,241	58,851	61,164	63,794	66,092
Vietnam	60,769	66,314	72,815	73,977	78,350	83,442	88,602
INDIAN OCEAN/SOUTH ASIA	887,528	982,936	1,075,593	1,093,724	1,164,367	1,248,752	1,330,356
Bangladesh	99,842	110,118	120,788	123,063	132,081	142,921	153,195
India	771,665	855,591	936,462	952,108	1,012,909	1,085,455	1,155,830
Sri Lanka	16,021	17,227	18,343	18,553	19,377	20,376	21,331
OCEANIA	22,428	24,156	25,882	26,203	27,460	28,960	30,388
Australia	15,788	17,033	18,079	18,261	18,950	19,729	20,434
New Zealand	3,247	3,299	3,508	3,548	3,698	3,868	4,029
Papua New Guinea	3,393	3,823	4,295	4,395	4,812	5,363	5,925

Note: The Asia-Pacific Region is defined here to include relatively populous coastal and island countries and areas of Asia and the western Pacific.

Source: U.S. Bureau of the Census, International Data Base.

Table 2. Average annual population growth rate for countries of the Asia-Pacific Region, by sub-region and country: 1980 to 2010

Region or Country	1980-85	1985-90	1990-95	1995-00	2000-05	2005-10
World	1.7	1.7	1.5	1.4	1.2	1.1
TOTAL ASIA-PACIFIC REGION	1.7	1.7	1.4	1.2	1.1	1.0
NORTHEAST ASIA	1.3	1.4	1.0	.9	.7	.6
China, Mainland	1.3	1.5	1.1	.9	.7	.6
China, Taiwan	1.6	1.0	1.0	.9	.8	.7
Hong Kong	1.5	.8	1.7	1.5	1.1	.9
Japan	.7	.5	.3	.2	.2	-.0
North Korea	1.7	1.8	1.8	1.6	1.3	1.0
South Korea	1.4	1.0	1.0	1.0	.9	.7
SOUTHEAST ASIA	2.1	1.9	1.8	1.6	1.5	1.3
Burma	2.0	1.9	1.9	1.8	1.7	1.6
Cambodia	2.6	3.3	3.8	2.7	2.6	2.6
Indonesia	2.1	1.8	1.6	1.5	1.4	1.2
Malaysia	2.4	2.4	2.2	2.0	1.8	1.7
Philippines	2.5	2.4	2.3	2.1	1.9	1.7
Singapore	2.3	2.3	1.8	1.7	1.2	.9
Thailand	1.7	1.4	1.1	1.0	.8	.7
Vietnam	2.3	1.7	1.9	1.5	1.3	1.2
INDIAN OCEAN/SOUTH ASIA	2.2	2.0	1.8	1.6	1.4	1.3
Bangladesh	2.5	2.0	1.8	1.8	1.6	1.4
India	2.2	2.1	1.8	1.6	1.4	1.3
Sri Lanka	1.5	1.5	1.3	1.1	1.0	.9
OCEANIA	1.6	1.5	1.4	1.2	1.1	1.0
Australia	1.5	1.5	1.2	.9	.8	.7
New Zealand	.8	.3	1.2	1.1	.9	.8
Papua New Guinea	2.5	2.4	2.3	2.3	2.2	2.0

Source: U.S. Bureau of the Census, International Data Base.

Table 3. Average annual population change for countries of the Asia-Pacific Region, by sub-region and country: 1980 to 2010 (population in thousands; parts may not add to totals due to rounding)

Region or Country	1980-85	1985-90	1990-95	1995-00	2000-05	2005-10
TOTAL ASIA-PACIFIC REGION	42,633	45,101	41,517	38,678	35,352	33,612
NORTHEAST ASIA	15,660	17,723	14,347	12,506	10,227	9,221
China, Mainland	13,638	16,157	12,871	11,075	8,999	8,385
China, Taiwan	298	188	199	188	182	168
Hong Kong	79	46	100	99	75	68
Japan	789	557	333	276	214	-21
North Korea	321	362	415	401	329	271
South Korea	536	413	430	467	428	349
SOUTHEAST ASIA	8,200	7,951	8,294	8,101	7,949	7,784
Burma	711	752	811	851	874	896
Cambodia	180	266	366	307	338	378
Indonesia	3,400	3,159	3,146	3,161	3,122	2,961
Malaysia	356	392	408	412	407	409
Philippines	1,338	1,451	1,565	1,620	1,619	1,613
Singapore	58	67	59	57	45	36
Thailand	850	756	638	585	526	460
Vietnam	1,307	1,109	1,300	1,107	1,018	1,032
INDIAN OCEAN/SOUTH ASIA	18,431	19,082	18,531	17,755	16,877	16,321
Bangladesh	2,353	2,055	2,134	2,259	2,168	2,055
India	15,854	16,785	16,174	15,290	14,509	14,075
Sri Lanka	224	241	223	207	200	191
OCEANIA	342	345	345	316	300	286
Australia	234	249	209	174	156	141
New Zealand	27	10	42	38	34	32
Papua New Guinea	80	86	94	103	110	113

Source: U.S. Bureau of the Census, International Data Base.

Table 4. Total urban population for selected countries of the Asia-Pacific Region, by sub-region and country: 1980 to 2010 (population in thousands)

Urban Population by Country	1980	1985	1990	1995	2000	2005	2010
TOTAL ASIA-PACIFIC REGION	596,140	705,166	836,518	981,222	1,145,662	1,324,627	1,518,208
NORTHEAST ASIA	321,544	377,115	448,062	523,408	604,957	687,413	771,215
China	195,880	241,217	302,690	369,492	443,057	518,609	596,766
Hong Kong	4,609	5,070	5,369	5,574	5,712	5,789	5,833
Japan	88,990	92,652	95,321	97,120	99,145	101,046	102,503
North Korea	10,387	11,698	13,024	14,650	16,392	18,062	19,728
South Korea	21,678	26,478	31,658	36,572	40,651	43,907	46,385
SOUTHEAST ASIA	87,086	108,088	132,822	161,906	195,080	231,386	269,661
Burma	8,108	9,019	10,350	12,188	14,640	17,798	21,786
Cambodia	804	1,119	1,554	2,123	2,809	3,631	4,612
Indonesia	33,564	43,811	55,981	70,053	85,885	102,647	119,133
Malaysia	5,787	7,195	8,909	10,814	12,820	14,866	16,910
Philippines	18,110	23,534	29,657	36,614	44,005	51,478	58,729
Singapore	2,414	2,558	2,705	2,848	2,967	3,061	3,144
Thailand	7,961	9,135	10,408	11,787	13,555	15,734	18,397
Vietnam	10,338	11,717	13,258	15,479	18,399	22,171	26,950
INDIAN OCEAN/SOUTH ASIA	172,015	203,397	237,838	276,823	325,226	384,092	454,157
Bangladesh	9,968	13,166	16,942	22,034	28,603	36,606	45,856
India	158,851	186,831	217,216	250,681	291,901	341,932	401,611
Sri Lanka	3,196	3,400	3,680	4,108	4,722	5,554	6,690
OCEANIA	15,495	16,566	17,796	19,085	20,399	21,736	23,175
Australia	12,495	13,367	14,369	15,318	16,279	17,245	18,284
New Zealand	2,597	2,717	2,851	3,077	3,278	3,452	3,599
Papua New Guinea	403	482	576	690	842	1,039	1,292

Note: China includes the mainland and Taiwan.

Source: UNPD, 1995, table A.3., 88-93.



Table 5. Population and average annual rates of growth for the highest density cities with a population of 2 million or more in 1992: 1992 to 2000

Rank by density	City	Country	Projected midyear population of built-up area (in thousands)			Projected average annual growth rate (percent)		Built-up area (square miles)	Projected 1992 population per square mile of built-up area
			1992	1995	2000	1992- 1995	1995- 2000		
1	Hong Kong	Hong Kong	5,762	5,841	5,956	.5	.4	23	250,524
2	Lagos	Nigeria	8,487	9,799	12,528	4.8	4.9	56	151,548
3	Dhaka	Bangladesh	4,640	5,296	6,492	4.4	4.1	32	144,991
4	Jakarta	Indonesia	10,185	11,151	12,804	3.0	2.8	76	134,014
5	Bombay	India	12,450	13,532	15,357	2.8	2.5	95	131,051
6	Ho Chi Minh City	Vietnam	3,725	4,064	4,481	2.9	2.0	31	120,164
7	Ahmadabad	India	3,826	4,200	4,837	3.1	2.8	32	119,555
8	Shenyang	China	4,323	4,457	4,684	1.0	1.0	39	110,848

Note: The population totals given here are derived from official census data available in 1985, but refer to built-up areas only. When these city projections were prepared in 1985, cities were defined as population clusters of continuous built-up area with a population density of at least 5,000 persons per square mile. Boundaries were determined by examining detailed maps of each city in conjunction with the most recent official population statistics. Exclaves of areas exceeding the minimum population density were added to the city if the intervening gap was less than one mile. To the extent practical, nonresidential areas such as parks, airports, industrial complexes, and water were excluded from the area reported for each city, thus making the population density reflective of the concentrations in the residential portions of the city. By using a consistent definition for each city, it is possible to make comparisons among cities on the basis of total population, area, and population density.

Source: U.S. Bureau of the Census, International Data Base.

Table 6. Total dependency ratio for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010

Region or Country	1990	1995	2000	2005	2010
TOTAL ASIA-PACIFIC REGION	58.0	55.6	52.7	48.6	46.1
NORTHEAST ASIA	48.9	47.7	46.6	42.8	41.1
China, Mainland	49.6	48.4	46.8	41.9	39.5
China, Taiwan	50.1	46.2	43.1	43.2	43.1
Hong Kong	43.2	43.2	42.0	41.6	40.4
Japan	43.6	43.8	46.8	51.4	57.4
North Korea	49.5	50.7	51.7	49.4	44.6
South Korea	44.6	41.2	40.6	42.9	43.6
SOUTHEAST ASIA	66.5	61.5	57.1	54.1	50.9
Burma	72.1	69.9	66.9	63.2	59.2
Cambodia	83.0	94.6	92.0	86.2	80.4
Indonesia	62.8	56.1	52.4	50.6	48.6
Malaysia	67.4	66.9	62.5	58.3	54.4
Philippines	76.8	72.7	68.5	64.1	59.3
Singapore	38.7	38.9	41.3	40.7	40.7
Thailand	52.0	45.9	42.7	43.3	42.9
Vietnam	77.3	71.7	61.3	52.4	45.6
INDIAN OCEAN/SOUTH ASIA	68.4	64.4	59.1	53.8	50.0
Bangladesh	85.1	75.2	64.8	57.7	51.9
India	66.7	63.3	58.6	53.5	49.9
Sri Lanka	58.8	53.6	47.5	44.9	44.3
OCEANIA	54.7	54.8	54.0	52.5	51.6
Australia	49.9	50.7	50.1	48.9	48.7
New Zealand	52.8	53.2	52.5	49.8	47.6
Papua New Guinea	82.5	76.7	72.9	69.5	65.6

Note: The total dependency ratio is the ratio of the population 0-14 and 65+ per 100 persons ages 15-64.

Source: U.S. Bureau of the Census, International Data Base.

Table 7. Child dependency ratio for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010

Region or Country	1990	1995	2000	2005	2010
TOTAL ASIA-PACIFIC REGION	50.3	47.2	43.5	38.8	35.6
NORTHEAST ASIA	39.8	37.6	35.2	30.5	27.8
China, Mainland	41.3	39.3	36.7	31.1	28.0
China, Taiwan	41.0	35.2	30.8	29.6	28.3
Hong Kong	30.2	27.9	24.6	22.9	21.2
Japan	26.4	23.1	22.0	22.7	23.9
North Korea	44.0	44.6	44.5	41.3	35.5
South Korea	37.4	33.1	30.8	30.9	29.5
SOUTHEAST ASIA	60.4	54.9	49.9	46.3	42.7
Burma	65.3	63.0	59.9	56.1	52.1
Cambodia	77.0	88.5	86.2	80.9	75.3
Indonesia	58.0	50.6	45.9	43.2	40.5
Malaysia	61.3	60.4	55.8	50.8	46.4
Philippines	70.7	66.7	62.4	57.7	52.5
Singapore	30.9	30.1	31.3	29.3	27.2
Thailand	44.8	38.0	33.5	32.3	30.5
Vietnam	68.9	63.0	52.7	44.0	37.7
INDIAN OCEAN/SOUTH ASIA	62.2	57.9	52.2	46.6	42.2
Bangladesh	79.0	69.5	59.4	52.3	46.1
India	60.5	56.8	51.6	46.1	41.9
Sri Lanka	50.5	44.5	37.8	34.3	32.4
OCEANIA	39.5	38.6	37.4	35.4	33.5
Australia	33.1	32.5	31.2	29.3	27.4
New Zealand	35.8	35.6	34.7	32.0	28.9
Papua New Guinea	77.9	71.6	67.7	64.2	60.1

Note: The child dependency ratio is the ratio of the population 0-14 per 100 persons ages 15-64.

Source: U.S. Bureau of the Census, International Data Base.

Table 8. Public expenditures on education as a percent of GNP,  
selected countries: 1980 and 1990

Country	1980	1990	Change 1980-90
Bangladesh	1.5	2.0	.5
China	2.5	2.3	-.2
Hong Kong	2.5	3.0	.5
India	2.8	3.5	.7
Japan	5.8	4.7	-1.1
South Korea	3.7	3.6	-.1
Philippines	1.7	2.9	1.2
Sri Lanka	2.7	2.7	.0
Thailand	3.4	3.8	.4

Source: UNESCO, 1993b, Table 10.

Table 9. Percent of population ages 15 to 24 for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010

Region or Country	1990	1995	2000	2005	2010
TOTAL ASIA-PACIFIC REGION	20.7	18.8	17.5	17.6	17.1
NORTHEAST ASIA	21.2	17.8	15.3	15.8	15.4
China, Mainland	21.9	18.1	15.5	16.4	16.1
China, Taiwan	18.3	17.8	17.5	15.1	13.2
Hong Kong	16.0	14.7	14.4	13.4	12.1
Japan	15.3	14.8	12.6	11.0	9.8
North Korea	24.2	19.0	15.6	15.9	17.1
South Korea	20.4	18.6	16.3	14.2	13.0
SOUTHEAST ASIA	20.3	20.1	19.8	18.8	17.9
Burma	19.9	19.3	19.3	19.3	19.2
Cambodia	21.9	16.9	16.9	19.9	20.5
Indonesia	20.4	20.7	20.1	18.3	17.1
Malaysia	19.8	18.4	18.4	19.2	18.9
Philippines	20.3	20.4	20.1	19.7	19.7
Singapore	18.7	14.6	12.3	12.7	13.4
Thailand	20.7	19.9	18.6	16.0	14.3
Vietnam	19.9	19.9	20.8	20.9	19.6
INDIAN OCEAN/SOUTH ASIA	20.3	19.5	19.4	19.5	18.8
Bangladesh	19.9	20.8	21.7	21.2	19.8
India	20.3	19.4	19.1	19.3	18.7
Sri Lanka	19.7	19.0	19.0	17.8	15.6
OCEANIA	16.9	16.1	15.0	14.8	14.9
Australia	16.2	14.8	13.6	13.5	13.5
New Zealand	16.9	16.1	14.2	14.2	14.8
Papua New Guinea	20.2	21.4	21.2	20.2	19.8

Source: U.S. Bureau of the Census, International Data Base.

Table 10. Average annual growth rates of enrollment in secondary and higher education for selected countries in the Asia-Pacific Region: 1980-2010

Country	Secondary education			Higher education		
	1980-90	1990-2000	2000-10	1980-90	1990-2000	2000-10
Bangladesh	3.1	3.3	2.2	6.1	3.3	2.0
China	-1.1	1.7	2.2	6.3	2.6	3.7
Hong Kong	-.2	-.1	-.3	3.8	2.5	.8
India	5.3	2.9	1.8	6.1	3.9	2.0
Indonesia	8.0	2.8	1.7	11.9	3.3	2.4
South Korea	.9	-.8	.0	10.1	.3	-.6
Malaysia	2.7	4.3	1.3	7.6	8.4	5.9
Philippines	3.3	3.2	1.1	3.0	4.5	1.9
Thailand	2.2	.6	.8	5.1	1.7	.9
Vietnam	1.5	2.6	1.7	.1	2.9	2.4

Source: UNESCO, 1993a, Table X.

Table 11. Percent of population ages 25 to 64 for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010

Region or Country	1990	1995	2000	2005	2010
TOTAL ASIA-PACIFIC REGION	42.6	45.5	48.0	49.6	51.4
NORTHEAST ASIA	46.0	49.9	52.9	54.2	55.4
China, Mainland	44.9	49.3	52.7	54.1	55.6
China, Taiwan	48.3	50.6	52.4	54.8	56.6
Hong Kong	53.9	55.1	56.0	57.2	59.1
Japan	54.4	54.7	55.5	55.1	53.8
North Korea	42.6	47.3	50.3	51.1	52.1
South Korea	48.7	52.2	54.8	55.8	56.6
SOUTHEAST ASIA	39.8	41.8	43.9	46.1	48.3
Burma	38.2	39.5	40.6	42.0	43.6
Cambodia	32.8	34.5	35.2	33.8	34.9
Indonesia	41.1	43.4	45.5	48.1	50.2
Malaysia	39.9	41.6	43.2	44.0	45.9
Philippines	36.3	37.5	39.3	41.2	43.1
Singapore	53.4	57.4	58.5	58.4	57.7
Thailand	45.1	48.6	51.5	53.8	55.7
Vietnam	36.5	38.3	41.2	44.7	49.1
INDIAN OCEAN/SOUTH ASIA	39.1	41.3	43.5	45.5	47.9
Bangladesh	34.1	36.2	38.9	42.2	46.0
India	39.7	41.9	44.0	45.9	48.1
Sri Lanka	43.3	46.1	48.8	51.3	53.7
OCEANIA	47.7	48.5	49.9	50.7	51.1
Australia	50.5	51.6	53.0	53.6	53.7
New Zealand	48.5	49.1	51.4	52.6	52.9
Papua New Guinea	34.5	35.2	36.7	38.9	40.6

Source: U.S. Bureau of the Census, International Data Base.

Table 12. Percent of population ages 65 and over for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010

Region or Country	1990	1995	2000	2005	2010
TOTAL ASIA-PACIFIC REGION	4.9	5.4	6.0	6.6	7.2
NORTHEAST ASIA	6.1	6.8	7.7	8.6	9.4
China, Mainland	5.6	6.1	6.9	7.6	8.3
China, Taiwan	6.1	7.5	8.6	9.5	10.3
Hong Kong	9.1	10.7	12.2	13.2	13.6
Japan	12.0	14.4	16.9	18.9	21.3
North Korea	3.7	4.1	4.7	5.5	6.3
South Korea	5.0	5.7	6.9	8.4	9.8
SOUTHEAST ASIA	3.7	4.1	4.6	5.1	5.4
Burma	3.9	4.1	4.2	4.3	4.5
Cambodia	3.3	3.1	3.0	2.9	2.8
Indonesia	3.0	3.6	4.3	4.9	5.4
Malaysia	3.7	3.9	4.1	4.7	5.2
Philippines	3.4	3.5	3.6	3.9	4.2
Singapore	5.6	6.3	7.1	8.1	9.6
Thailand	4.8	5.4	6.5	7.6	8.7
Vietnam	4.7	5.1	5.4	5.5	5.4
INDIAN OCEAN/SOUTH ASIA	3.7	3.9	4.3	4.7	5.2
Bangladesh	3.3	3.2	3.3	3.5	3.8
India	3.7	4.0	4.4	4.8	5.4
Sri Lanka	5.2	5.9	6.6	7.3	8.3
OCEANIA	9.8	10.5	10.8	11.2	12.0
Australia	11.2	12.1	12.6	13.2	14.3
New Zealand	11.2	11.5	11.6	11.9	12.6
Papua New Guinea	2.6	2.9	3.0	3.1	3.3

Source: U.S. Bureau of the Census, International Data Base.



Table 13. Average annual outflow of Asian migrant workers  
by region and country of origin (in thousands)

Country or region of origin	1975- 1979	1980- 1984	1985- 1989	1990- 1991
<b>Northeast Asia</b>				
China	-	-	69.0	73.9
South Korea	72.3	171.1	89.7	55.8
<b>Southern Asia</b>				
Bangladesh	17.3	55.3	79.8	125.5
India	67.0	236.5	139.7	-
Nepal	-	-	0.5	0.5
Pakistan	92.3	134.0	80.3	128.3
Sri Lanka	14.3	28.5	18.4	53.8
<b>Southeast Asia</b>				
Indonesia	5.8	24.4	63.5	105.5
Myanmar	-	-	8.1	9.8
Philippines	76.0	330.9	426.0	530.6
Thailand	6.3	60.0	97.0	63.5
Vietnam	-	13.3	38.9	2.1
<b>Northeast Asia</b>	72.3	171.1	158.7	129.7
<b>Southern Asia</b>	190.8	454.3	318.7	308.1
<b>Southeast Asia</b>	88.1	428.7	633.6	711.4
<b>Total</b>	351.2	1,054.0	1,111.0	1,149.1

Source: UN, 1994, 399.

Table 14. Number of refugees in selected Asia-Pacific countries by country of asylum and origin: 1991-1994

Country of asylum	Region, country, or group of origin	Total at end of year			
		1991	1992	1993	1994
Australia	Various	32,400	35,600	32,400	32,400
Bangladesh	Myanmar & others	40,300	245,000	199,000	116,200
China	Vietnamese	284,500	285,500	288,100	285,500
	Other	4,300	2,500	100	1,600
Hong Kong	Vietnamese	60,000	45,300	31,100	24,300
India	Afghan	9,800	11,000	24,400	22,400
	Sri Lankan Tamil	200,000	113,400	73,500	73,500
	Bangladesh	--	53,200	56,000	53,500
	Tibetan	--	80,000	105,500	108,000
	Other	800	800	900	900
Indonesia	Vietnamese	17,000	15,000	10,200	6,600
	Other	1,700	600	500	--
Japan	Indo-China	9,100	8,200	900	9,100
Malaysia	Vietnamese	12,500	10,300	7,400	5,400
	Other	1,500	--	100	5,100
New Zealand	Various	16,800	17,300	10,400	10,400
Papua New Guinea	Indonesia	6,100	6,700	7,700	8,500
Philippines	Vietnamese	19,800	6,700	1,700	700
	Other	100	--	800	--
South Korea	Vietnamese	200	100	--	--
Singapore	Various	200	100	--	--
Thailand	Lao	57,300	40,900	25,100	11,900
	Vietnamese	13,700	12,600	1,700	6,100
	Cambodian	385,000	141,100	100	--
	Myanmar	--	--	74,500	82,400
	Other	2,200	3,000	3,000	400
Vietnam	Cambodian	20,100	16,300	5,100	45,000
Total, selected countries		1,195,400	1,151,200	960,200	909,900

Sources: UNHCR, personal communication; UNHCR, 1994, table 2, 15-18; and UNHCR, 1995, tables 3,8.

Table 15. Asia-Pacific Region, growth in economies and agriculture

Country	Average annual growth rate (percent)						Food production per capita 1979-92
	GNP per capita, 1992 dollars	GNP per capita, 1980-92	GDP 1970-80	GDP 1980-92	Agriculture 1970-80	Agriculture 1980-92	
Japan	28,190	3.6	4.3	4.1	-2	.7	-2
Singapore	15,730	5.3	8.3	6.7	1.4	-6.6	-5.6
Hong Kong	15,360	5.5	9.2	6.7	n.a.	n.a.	2.8
South Korea	6,790	8.5	9.6	9.4	2.7	1.9	.8
Malaysia	2,790	3.2	7.9	5.9	n.a.	3.6	4.0
Thailand	1,840	6.0	7.1	8.2	4.4	4.1	.3
Philippines	770	-1.0	6.0	1.2	4.0	1.0	-1.2
Indonesia	670	4.0	7.2	5.7	4.1	3.1	2.0
Sri Lanka	540	2.6	4.1	4.0	2.8	2.1	-2.2
China, Mainland	470	7.6	n.a.	9.1	n.a.	5.4	2.9
India	310	3.1	3.4	5.2	1.8	3.2	1.6
Bangladesh	220	1.8	2.3	4.2	.6	2.7	-.3
Burma (Myanmar)	n.a.	n.a.	4.7	.6	4.3	.5	-1.9

Notes: The following countries and areas have been excluded from the table because usable and comparable data or estimates are unavailable from the World Bank: North Korea, Cambodia, China (Taiwan), Vietnam.

n.a. = not available

Source: World Bank, 1994, 162-165, 168-169, 228.

Table 16. Estimated and projected net grain import needs for developing countries in Asia: 1980-2030  
(millions of metric tons)

Country/ Region	Study	ca 1980	ca 1990	Low Medium High			2010	Low High		Low High		2030
				2000	2000	2000		2020	2020	2025	2025	
Developing countries	WB	60.4	87.0		139.8		210.0					
Developing countries	FAO	67.0	90.0				162.0					
East Asia	FAO	19.0	20.0				22.0					
East Asia	WB	15.3	21.9		31.4		39.0					
China	WB	14.0	3.7		11.3		21.6					
China	USDA	11.6	7.0		14.1	31.5						
China	WWI		6.0									207-369
Indonesia	WB	3.5	2.1		5.7		7.6					12
Indonesia	WWI		3.0									
Indonesia	USDA	2.9	2.2	1.8	2.6	7.5						
Philippines	USDA	1.0	1.9	3.0	3.5	4.3						
Thailand	WB	-5.3	-5.1		-7.2		-9.1					
Thailand	USDA	-5.4	-4.7	-6.1	-5.4	-5.0						
Vietnam	USDA	-.1	-1.4	-1.4	-2.0	-3.1						
South Asia	FAO	1.0	5.0				10.0					
South Asia	IFPRI									50	260	
South Asia	WB	2.1	2.9		9.2		12.8					
Bangladesh	USDA	1.7	1.6	1.9	2.6	3.1						
Bangladesh	Dyson							13.3	25.7			9
Bangladesh	WWI		1.0									45
India	WWI		.0									
India	Dyson							-80.6	-25.1			
India	USDA	-.2	-.6	-2.2	-.6	.6						
India	WB	-.8	-1.1		6.9		14.1					
Sri Lanka	Dyson							.6	1.2			

Note: Negative values indicate net exports.

Sources:

Dyson - Dyson, 1993, 36.

FAO - FAO, 1993, 67.

IFPRI - Hazell, 1994, 6.

USDA - USDA-ERS, 1993a.

WB - Mitchell and Ingco, 1993, 162.

WWI - Brown and Kane, 1994, 168 and 178; Brown, 1995, 95-101.

Table 17. World fish catch, total and per person,  
1950-93

Year	Total (million tons)	Per Person (kilograms)
1950	22	8.6
1951	26	10.0
1952	25	9.5
1953	26	9.7
1954	27	9.9
1955	29	10.4
1956	30	10.6
1957	31	10.7
1958	33	11.2
1959	36	12.0
1960	38	12.5
1961	42	13.6
1962	45	14.4
1963	48	15.0
1964	53	16.2
1965	54	16.1
1966	57	16.7
1967	60	17.2
1968	64	18.0
1969	63	17.4
1970	66	17.8
1971	66	17.5
1972	62	16.1
1973	63	16.0
1974	67	16.7
1975	66	16.2
1976	69	16.6
1977	70	16.5
1978	70	16.3
1979	71	16.2
1980	72	16.2
1981	75	16.6
1982	77	16.7
1983	77	16.4
1984	84	17.6
1985	86	17.7
1986	93	18.8
1987	94	18.7
1988	99	19.4
1989	100	19.2
1990	97	18.3
1991	97	18.0
1992	98	17.9
1993	98	17.6

Note: Includes capture and culture seafood from  
marine and freshwater sources.

Source: Worldwatch Institute, 1994.

Table 18. Fish catches in major Indian Ocean and Pacific Ocean fishing areas: 1983-1992  
(thousands of metric tons)

Fishing area	Code	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>Indian Ocean</b>											
Western	51	2,219	2,538	2,652	2,660	2,725	2,987	3,380	3,350	3,546	3,747
Eastern	57	2,275	2,339	2,276	2,514	2,674	2,678	2,777	2,795	3,101	3,262
<b>Pacific Ocean</b>											
Northwest	61	21,223	23,707	23,714	25,620	25,765	26,594	26,250	25,674	24,302	24,199
Northeast	67	2,414	2,689	2,884	3,225	3,455	3,355	3,286	3,391	2,966	3,148
Western Central	71	5,995	5,863	5,920	6,429	6,855	7,011	7,200	7,524	7,871	7,710
Eastern Central	77	1,228	1,215	1,706	1,649	1,740	1,664	1,756	1,520	1,507	1,342
Southwest	81	568	613	586	759	902	1,045	1,048	1,048	1,138	1,114
Southeast	87	6,665	9,468	10,743	13,002	10,991	13,777	15,337	13,974	14,359	13,899

Notes: Peak production year is shaded.  
See figure 26 for fishing area boundaries.

Source: FAO, 1994a, 499-521.

Table 19. Number of distant-water fishing vessels: 1985 to 1991

Country	1985	1986	1987	1988	1989	1990	1991
China, Mainland	17	N/A	N/A	87	N/A	N/A	198
China, Taiwan	1,284	1,310	1,432	1,568	1,709	1,786	1,613
Japan	3,272	3,222	3,251	3,345	3,389	3,269	3,048
South Korea	651	676	710	761	799	783	771

Note: China (Taiwan) and Japan include only fishing vessels having more than 100 gross registered tons.

Source: U.S. NOAA, 1993, 11 and 52.

Table 20. Fish catches by countries or areas and major fishing areas (thousands of metric tons)

Country or area	Fishing area	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Australia	57	107	107	98	104	112	113	83	89	93	113
	71	24	24	25	26	30	31	37	37	44	33
	81	36	34	35	47	59	66	58	90	86	84
Bangladesh	57	141	165	188	207	233	245	252	253	259	280
Cambodia	71	9	8	11	7	17	21	26	40	36	34
China, Mainland	61	3,372	3,677	3,925	4,513	5,247	5,779	6,335	6,828	7,572	8,745
	67	N/A	N/A	N/A	N/A	20	20	20	20	30	40
China, Taiwan	41	3	3	90	109	157	141	128	114	138	111
	61	680	750	653	671	741	822	887	917	773	801
	71	21	25	55	52	69	98	100	129	121	139
Hong Kong	61	182	193	192	208	222	232	237	228	225	224
India	51	1,016	1,259	1,266	1,201	1,115	1,210	1,652	1,603	1,745	1,795
	57	503	520	468	516	563	597	608	617	644	678
Indonesia	57	307	319	320	342	381	424	447	419	446	462
	71	1,365	1,385	1,439	1,507	1,550	1,660	1,738	1,832	1,994	2,034
Japan	61	9,475	10,231	9,789	10,391	10,147	10,411	9,759	9,120	8,108	7,318
	67	802	722	552	329	218	54	47	40	29	25
	71	296	300	185	345	323	345	319	280	323	292
	77	115	119	222	165	183	152	145	159	149	113
	81	132	167	154	194	243	295	287	233	181	198
New Zealand	81	282	322	305	345	419	552	567	559	608	678
North Korea	61	1,510	1,550	1,590	1,600	1,600	1,600	1,600	1,640	1,600	1,640
Malaysia	57	423	390	351	351	352	343	345	338	359	370
	71	303	271	273	257	255	254	249	251	247	254
Myanmar (Burma)	57	445	466	497	535	541	560	591	599	594	618
Philippines	71	1,318	1,334	1,331	1,378	1,426	1,463	1,545	1,623	1,699	1,691
South Korea	41	2	5	16	58	100	104	143	116	197	233
	61	1,814	1,863	1,988	2,252	2,128	2,159	2,212	2,211	1,828	1,938
	67	363	400	399	518	320	135	118	81	47	84
	71	18	19	18	33	63	104	144	206	256	210
Sri Lanka	51	183	139	146	146	149	160	166	134	174	185
Thailand	57	307	327	313	403	427	338	411	449	679	723
	71	1,797	1,647	1,745	1,945	2,175	2,107	2,080	2,107	2,030	1,899
Vietnam	71	553	548	572	576	612	642	662	697	751	810

Note: FAO fishing area codes are defined as follows:

- 41 Atlantic, Southwest
- 51 Indian Ocean, Western
- 57 Indian Ocean, Eastern
- 61 Pacific, Northwest
- 67 Pacific, Northeast
- 71 Pacific, Western Central
- 77 Pacific, Eastern Central
- 81 Pacific, Southwest
- 87 Pacific, Southeast

Source: FAO, 1994a, 497-521 and 533-544.



Table 21. Annual seafood consumption per person in selected countries, mid-1980s

Country	Seafood (kg of live weight)
Japan	69
South Korea	51
Philippines	34
Spain	33
France	26
Canada	22
Thailand	22
United States	19
United Kingdom	19
Poland	19
Italy	18
Australia	17
Indonesia	14
Vietnam	12
Mexico	10
Argentina	7
Turkey	7
Bangladesh	7
China	6
Brazil	6
Nigeria	6
Egypt	6
Kenya	5
Algeria	4
India	3
Iran	3
Pakistan	2
Sudan	1
Ethiopia	0.1

Note: Shading indicates countries defined as "Asia-Pacific Region."

Source: Brown and Kane, 1994, 79.

## Bibliography

- Agence France Presse (AFP). 1994. "Mekong Flood Threatens Vietnam's Economic Performance." October 9, 1994. Hanoi.
- \_\_\_\_\_. 1994. "Moslem Separatism Threatening Xinjiang." January 25, 1994. Beijing.
- \_\_\_\_\_. 1993. "Delhi Tells Dhaka to Stop Politicking over Water-sharing." October 14, 1993. Dhaka.
- Agnote, Dario B. 1994. "Ramos' Adviser Proposes Regional Labor Agreement." *Japan Economic Newswire*. February 14, 1994. Manila.
- Ahmed, Anis. 1994. "Bangladeshis Hold Violent Anti-India Water Protest." *Reuters World Service*. May 17, 1994. Dhaka.
- Anderson, John. 1995. "Feeding a Hungrier World." *The Washington Post*. February 13, 1995. A3.
- Asiaweek. 1994. "AIDS: Tying the Knot in India." August 31, 1994. 26.
- Avery, Dennis T. 1994. "Feast or Famine?" *Far Eastern Economic Review*. December 1, 1994. 40.
- Bangkok Post*. 1993. "Farmers vs Golf Course Owners on Water Resources." May 17, 1993. Thailand.
- Banister, Judith. 1993. *Vietnam Population Dynamics and Prospects*. Indochina Research Monograph, University of California. Berkeley.
- \_\_\_\_\_. 1988. "The Aging of China's Population." *Problems of Communism*. United States Information Agency. November-December 1988.

- \_\_\_\_\_. 1982. "Population Trends in the Pacific Region," in *Pacific Symposium 1982*. National Defense University. Washington, D.C.
- Banister, Judith, and Christina Wu Harbaugh. 1992. "Rural Labor Force Trends in China." In *China Agriculture and Trade Report, Situation and Outlook Series*. U.S. Department of Agriculture, Economic Research Service, No. RS-92-3, July 1992.
- Birsel, Robert. 1994. "Thailand Insists Burmese Refugees Must Go Home." *Reuters World Service*. August 19, 1994. Thailand.
- Bhattarai, Binod. 1993. "South Asia-Water: Waiting for the Next Great Flood." *Inter Press Service*. November 29, 1993. Kathmandu.
- Bongaarts, John. 1994. "Can the Growing Human Population Feed Itself?" *Scientific American*. March. 36.
- Brandon, Carter, and Ramesh Ramankutty. 1993. *Toward an Environmental Strategy for Asia*. World Bank Discussion Papers, No. 224. Washington, D.C.
- Branigin, William. 1994. "Environmentalists Charging U.S. Left Toxic Residue in Philippines." *The Washington Post*. November 12, 1994. A18.
- Brown, Lester. 1995. *Who will Feed China?* Worldwatch Environmental Alert Series. W.W. Norton & Co. New York.
- \_\_\_\_\_. 1994. "How China Could Starve the World." *The Washington Post*. August 28, 1994. C1.
- Brown, Lester R., et al. 1994. *State of the World 1994. A Worldwatch Institute Report on Progress Toward a Sustainable Society*. W.W. Norton & Co. New York.
- Brown, Lester R. and Hal Kane. 1994. *Full House. Reassessing the Earth's Population Carrying Capacity*. Worldwatch Environmental Alert Series. W.W. Norton & Co. New York.

- Brown, Tim, and Peter Xenos. 1994. *AIDS in Asia: The Gathering Storm*. Asia-Pacific Issues Series, Analysis from the East-West Center No. 16. Honolulu.
- Burns, John F. 1994. "60 Die in Separatist Battles in Northeast India." July 25, 1994. A3. New Delhi.
- Burton, Sandra. 1994. "Taming the River Wild." *Time*. December 19, 1994. 62-64.
- Center for Migration Studies. 1992. *International Migration Review*, Vol. 26. Fall 1992. New York.
- Chandra, Rajiv. 1993. "China: Tensions Rise in Muslim-Dominated Provinces." *Inter Press Service*. November 5, 1993. Beijing.
- The Christian Science Monitor*. 1993. "China's Undercover War on Religious Life." November 4, 1993. 9. Tibet.
- Corbin, Jinkie, and Anne Ryan. 1994. "Overview of HIV/AIDS in Asia," in *Recent HIV Seroprevalence Levels by Country: December 1994*. U.S. Bureau of the Census, Health Studies Branch, Research Note No. 15.
- Coughlin, Christopher. 1994. "Burma's Muslims are Reluctant to Go Home." *The Christian Science Monitor*. October 5, 1994. 14. Bangladesh.
- Crook, Frederick. 1994. "Could China Starve the World?/Comments on Lester Brown's Article." *Asia & Pacific Rim Agriculture and Trade Notes*. USDA. September 15, 1994.
- Crothall, Geoffrey and Willy Wo-lap Lam. 1994. "Grain Supplies Stepped up in Move to Avoid Price Protests." *South China Morning Post*. January 6, 1994. 1.
- Dyson, Tim. 1993. "Population and Food in South Asia: Recent Trends and Prospects." Paper prepared for the session on Population and Sustainable Development at the XVII Annual Conference of the Indian Association for the Study of Population, held at Annamalai University, Tamil Nadu, December 16-19, 1993. London.

- Engelman, Robert and Pamela LeRoy. 1993. *Sustaining Water; Population and the Future of Renewable Water Supplies*. Population and Environment Program/Population Action International. Washington, D.C.
- Fong, Pang Eng. 1994. "Labor Migration, Economic Development and Regionalisation in the Pacific Asian Region." *Migration and Development/New Partnerships for Cooperation*.
- Food and Agriculture Organization of the United Nations (FAO) 1993. *Agriculture: Towards 2010*. November. Rome.
- \_\_\_\_\_. 1994a. FAO Yearbook. *Fishery Statistics. Catches and Landings*. Vol.74. Rome. 1994.
- \_\_\_\_\_. 1994b. *Review of the State of World Marine Fishery Resources*. FAO Fisheries Technical Paper 335. Rome.
- Frederick, Kenneth D. 1993. *Balancing Water Demands with Supplies—The Role of Management in a World of Increasing Scarcity*. World Bank Technical Paper No. 189. Washington, D.C.
- Frederiksen, Harald D., Jeremy Berkoff and William Barber. 1993. *Water Resources Management in Asia*. Vol. I, Main Report. World Bank Technical Paper Number 212. The World Bank. Washington, D.C.
- Gao, Anming. 1994. "Reuter Textline." *China Daily*. China. April.
- Griffin, Kathy. 1993. "Threat to HK Over Rising Seas." *South China Morning Post*. July 2, 1993. 6.
- Hanenberg, Robert S., Wiwat Rojanapithayakorn, Prayura Kunasol, and David C. Sokal. 1994. "Impact of Thailand's HIV-control Programme as Indicated by the Decline of Sexually Transmitted Diseases." *The Lancet*, Vol. 344. July 23, 1994. 243-245.
- Hazell, Peter. 1994. "Prospects for a Well-Fed World." (Draft). International Food Policy Research Institute. Washington, D.C. March.

- Heginbotham, Erland. 1996. *Asian Prospects and Challenges, 1995-2010*. Center for Naval Analyses. Washington, D.C.
- Hossain, Farid. 1993. "Some Bangladeshis Oppose Flood-Control Plan." Associated Press. September 28, 1993. Dhaka, Bangladesh.
- Huguet, Jerrold W. 1992. "The Future of International Migration in Asia," *Asian and Pacific Migration Journal*, Vol. 1, No. 2. Scalabrini Migration Center. Philippines.
- International Labour Office (ILO). 1995. *World Employment 1995*. Geneva.
- \_\_\_\_\_. 1992a. *Year Book of Labour Statistics*, 51st Issue. Geneva.
- \_\_\_\_\_. 1992b. *Social and Labour Bulletin*, No. 2. June 1992. Geneva.
- Jacob, Paul. 1994. "Rich Chinese Indonesians Objects of Envy." *The Straits Times*. August 28, 1994. 14. Singapore.
- Japan Statistics Bureau. 1992. *Japan Statistical Yearbook*. 1992. Tokyo.
- Kahn, Joseph. 1995. "Feeding the Masses/China's Industrial Surge Squeezes Grain Farms, Spurs Need for Imports." *The Wall Street Journal*. March 10, 1995. A1.
- Kaye, Lincoln. 1994. "The Reckoning." *Far Eastern Economic Review*. October 27, 1994. 24-28.
- Kristof, Nicholas. 1993. "A Muslim Region is Tugging at the Ties That Bind China." *The New York Times*. August 14, 1993. Section 1, 1. Kashgar, China.
- Kyodo News Service. 1995. "Thai Government Endorses New Agreement on Mekong Cooperation." Japan Economic Newswire. February 28, 1995. Bangkok.
- Ling, Chee Yoke. 1994. "Not Too Early to Worry About Water Resource Planning." *Business Times*. March 30, 1994. 12.
- Mahbubani, Kishore. 1995. "The Pacific Way." *Foreign Affairs*. January/February 1995. 100-111.

- Mallet, Victor. 1993. "Business and the Environment: Stagnant Rivers and Poisoned Seas - Victor Mallet Examines Thailand's Pollution Problems/Worldwide Water." *Financial Times*. March 31, 1993. 18.
- Mathews, Jay. 1995. "First Poll of China Finds Materialism Alive." *The Washington Post*. February 16, 1995. A13.
- Mayer, Caroline E. 1994. "Be Prepared for More Frozen Fish." *The Washington Post*. August 14, 1994. A28.
- Mertens, Thierry E., Richard J. Hayes, and Peter G. Smith. 1990. "Epidemiological Methods to Study the Interaction Between HIV Infection and Other Sexually Transmitted Diseases." *AIDS*, Vol. 4, No. 1. January 1990. 57-65.
- Mitchell, Donald and Merlinda Ingco. 1993. *The World Food Outlook*. International Economics Department of the World Bank. Washington, D.C. November.
- Moore, Molly. 1994. "In India, a Battle for Survival." *The Washington Post*. August 14, 1994. A29.
- \_\_\_\_\_. 1994. "Sri Lanka's Landslide Winner Campaigned Against Violence." *The Washington Post*. November 11, 1994. A33.
- Mufson, Steven. 1995. "Rights Group Warns China on Dam Project." *The Washington Post*. February 22, 1995. A14.
- National Geographic*. 1993. "Bangladesh Battles Hard to Stay Above Water." *Los Angeles Times*. September 5, 1993.
- Naughton, Philippe. 1994. "WHO Says Chinese Herb Beats Killer Malaria Strain." Reuters World Service. April 15, 1994. Geneva.
- Ofreneo, Rene E. and Rosalinda Pineda-Ofreneo. 1991. "Filipino Workers in Japan: Caught in an Unequal Global Division of Labor." Paper presented at the symposium on "Japanese Economy and Migrant Workers from Abroad," October 12, 1991, at Kanagawa University, Yokohama, Japan.

Pitayanon, S., W. Janjareon, and S. Kongsin. 1995. "Thailand: The Epicentre in Asia." *AIDS Analysis Asia*, Vol. 1, No. 1. January-February 1995. 14-15.

Postel, Sandra. 1992. *Last Oasis: Facing Water Scarcity*. W.W. Norton & Co. New York.

Rensberger, Boyce. 1994. "New 'Super Rice' Nearing Fruition." *The Washington Post*. October 24, 1994. A1 and A6.

Reuters Library Report. 1993. "U.N. Won't Protect Cambodian Refugees Left Behind." April 30, 1993. Phnom Penh.

\_\_\_\_\_. 1993. "India Criticizes Dhaka's Stance on Water Dispute." October 14, 1993. Dhaka.

Reuters World Service. 1994. "Bangladesh Concerned Over India Barrage Plan." March 11, 1994. Dhaka.

\_\_\_\_\_. 1994. "India's Naga Separatists Kill 21 Soldiers." August 19, 1994. Guwahati.

\_\_\_\_\_. 1995. "Bangladesh, India Attempt to Resolve Water Dispute." January 26, 1995. Colombo.

Richardson, Michael. 1994. "Indonesia at Edge of a Water Crisis; Economic Scene." *International Herald Tribune*. November 26, 1994. Jakarta.

Rojanapithayakorn, Wiwat. 1994. "Evolution of the Response to AIDS in Thailand," *AIDS Captions* (Family Health International), Vol. 1, No. 3. August 1994. 9-12.

Rosegrant, Mark W., et al. 1995. "Global Food Supply, Demand, and Trade to 2020: Projections and Implications for Policy and Investment," mimeo.

Sadiq, Jahabar. 1993. "Malaysia: Countering Water Pollution." *Business Times*. December 15, 1993. Malaysia.

Shenon, Philip. 1994. "Yangon Journal: AIDS Onslaught Breaches the Burmese Citadel." *The New York Times*. March 11, 1994. A4.



- Skeldon, Ronald. 1992. "International Migration Within and From the East and Southeast Asian Region: A Review Essay," *Asian and Pacific Migration Journal*, Vol.1, No. 1. Scalabrini Migration Center. Philippines.
- South China Morning Post*. 1994. "No Time for Despair." December 26, 1994. 10.
- SSB. 1994. State Statistical Bureau, People's Republic of China. *Statistical Yearbook of China*. China Statistical Publishing House. 1994. Beijing.
- Stanecki, Karen and Peter Way. 1996, forthcoming. "The Dynamic HIV/AIDS Pandemic," in *AIDS in the World, Volume II*, by the Global AIDS Policy Coalition. Oxford University Press.
- \_\_\_\_\_. 1994. *The Impact of HIV/AIDS on World Population*. U.S. Bureau of the Census. Washington, D.C. May 1994.
- Stevens, Jane E. 1995. "Indonesia's Streetwise War on AIDS has the World Watching." *The Washington Post*. February 20, 1995. A3.
- Straits Times*. 1993. "Floods Still Occur Despite Priority Given to Problem." November 21, 1993. 22. Malaysia.
- Sun, Lena H. 1994. "Influx of Chinese Workers Heightens Tension in Tibet." *International Herald Tribune*. September 16, 1994. Tibet.
- Suro, Roberto. 1994. "Chinese Smuggling Grows, Forcing U.S. Reassessment." *The Washington Post*. June 2, 1994, A1 and A15.
- Swardson, Anne. 1994. "Net Losses: Fishing Decimating Oceans' 'Unlimited Bounty.'" *The Washington Post*. August 14, 1994. A1 and A28.
- Thomas, Christopher. 1994. "Arid Bangladesh Accuses India of Choking Ganges." *The Times*. July 15, 1994. Dhaka.
- Trueheart, Charles. 1994. "American or Canadian? Whose Salmon Is It Anyway." *The Washington Post*. August 14, 1994. A29.

- Tunsarawuth, Sinfa. 1995. "Four Nations to Sign Pact on Lower Mekong." March 1, 1995. 13. Singapore.
- Tyler, Patrick E. 1994. "China Moves Ahead on Huge But Disputed Dam." *The New York Times*. December 27, 1994. A3. Beijing.
- United Nations (UN). 1994. *World Population Monitoring, 1993*. (Draft). New York.
- United Nations Development Programme (UNDP). 1994. "Demining Programme in Cambodia Expands its Reach." *Update*. Vol. 7, No. 19. September 26, 1994. New York.
- \_\_\_\_\_. 1994. "Cambodia, Laos, Thailand and Vietnam Accept Historic Document for Mekong Development." *Update*. Vol. 7, No. 25. December 19, 1994. New York.
- United Nations Education, Scientific and Cultural Organization (UNESCO). 1993a. *Trends and Projections of Enrollment by Level of Education, by Age, and by Sex*. UNESCO Publishing. Paris.
- \_\_\_\_\_. 1993b. *World Education Report 1993*. UNESCO Publishing. Paris.
- United Nations High Commissioner for Refugees (UNHCR). 1995. *Populations of Concern to UNHCR, A Statistical Overview, 1994*. Geneva.
- \_\_\_\_\_. 1994. *Populations of Concern to UNHCR, A Statistical Overview*, mimeo. Geneva.
- \_\_\_\_\_. 1993. *The State of the World's Refugees: The Challenge of Protection*. New York.
- United Nations Population Division (UNPD). 1995. *World Urbanization Prospects, The 1994 Revision*. New York.
- United Press International (UPI). 1994. "China Sets Dissident, Minority Laws." May 6, 1994. Beijing.
- \_\_\_\_\_. 1993a. "Investigators Said to Uncover Evidence on Pakistani Involvement." March 27, 1993. New Delhi.

- \_\_\_\_\_. 1993b. "More than 50,000 Filipinos Infected with HIV." December 8, 1993. Manila.
- U.S. Bureau of the Census. 1996. *International Data Base*. Washington, D.C.
- \_\_\_\_\_. 1994. *Statistical Abstract of the United States: 1994*. (114th edition). Washington, D.C.
- \_\_\_\_\_. 1993. *Statistical Abstract of the United States: 1993*. (113th edition). Washington, D.C.
- U.S. Centers for Disease Control (CDC). 1994. "Human Plague - India, 1994." *Morbidity and Mortality Weekly Report*. Vol. 43, No. 38. September 30, 1994.
- \_\_\_\_\_. 1994. "Detection of Notifiable Diseases Through Surveillance for Imported Plague-New York, September-October 1994." *Morbidity and Mortality Weekly Report*. Vol. 43, No. 44. November 11, 1994.
- U.S. Central Intelligence Agency (CIA). 1993. *Handbook of International Economic Statistics, 1993*. Washington, D.C.
- U.S. Department of Agriculture, Economic Research Service (USDA-ERS). 1994. *International Agriculture and Trade Reports: Food Aid Needs Assessment*. Washington, D.C.
- \_\_\_\_\_. 1993a. *International Agriculture and Trade Reports: Asia*. Washington, D.C.
- \_\_\_\_\_. 1993b. *World Agriculture: Trends & Indicators, 1961-91*. Tables for selected countries and regions, electronic data base. Washington, D.C. Published as *World Agriculture: Trends and Indicators, 1970-91*. Washington, D.C. Economic Research Service Statistical Bulletin No. 861.
- U.S. National Oceanic and Atmospheric Administration (NOAA). 1993. *World Fishing Fleets, An Analysis of Distant-Water Fleet Operations. Vol. III: Asia*. November 1993. Silver Spring, Maryland.

Wagstyl, Stefan. 1994. "Modernising India Still Hobbled by Old Divide: Mass Education and the Media Have Failed to Stop a Surge in Caste-Awareness." *Financial Times*. December 6, 1994. 4.

\_\_\_\_\_. 1993. "Survey of India." *Financial Times*. September 30, 1993. II.

Weber, Peter. 1994. *Net Loss: Fish, Jobs, and the Marine Environment*. Worldwatch Paper 120. Washington, D.C.

\_\_\_\_\_. 1993. *Abandoned Seas: Reversing the Decline of the Oceans*. Worldwatch Paper 116. Washington, D.C.

World Bank. 1994. *World Development Report 1994*. Oxford University Press. New York.

World Health Organization (WHO). 1995. "Global Programme on AIDS, The Current Global Situation of the HIV/AIDS Pandemic." January 3, 1995.

Worldwatch Institute. 1994. "Worldwatch Database Diskette." Washington, D.C.

Xinhua News Agency. 1993. "AIDS Threatens ASEAN." October 13, 1993. Manila.

Youngblood, Ruth. 1995. "Human Rights Group Blasts Three Gorges Dam." United Press International. February 21, 1995. Beijing.

Zhongguo Tongxun She. 1994. "Enterprises Have 17 Million Surplus Workers" in Chinese. September 13, 1994. Translated by Foreign Broadcast Information Service, FBIS-CHI-94-192. October 4, 1994. Hong Kong.

Zhongguo Xinwen She. 1994. "Very Serious Water Shortage Reported in 50 Cities." June 6, 1994. Beijing.

## List of figures

Figure 1. Sub-regions of the Asia-Pacific Region . . . . .	12
Figure 2. Population geography: World and Asia-Pacific Region 1996 . . . . .	14
Figure 3. Average annual growth of population and GNP per capita for selected developing countries in the Asia-Pacific Region . . . . .	16
Figure 4. Reported and projected urban populations, Asia-Pacific Region and sub-regions: 1980–2010 . . . . .	18
Figure 5. Agricultural labor force per 1,000 hectares: 1961–1991 . . . . .	20
Figure 6. Changes in public expenditures for education as a percent of GNP (1980–90) and child dependency ratio (1990) . . . . .	23
Figure 7. Television sets per 1,000 population . . . . .	26
Figure 8. HIV seroprevalence for sex workers in Asia . . . . .	40
Figure 9. HIV seroprevalence for high-risk populations: India . . . . .	41
Figure 10. HIV seroprevalence for sex workers in Thailand: 1990 to 1994 . . . . .	42
Figure 11. Potential for spread of HIV/AIDS epidemic. . . . .	47
Figure 12. Growth rate of world per capita grain production, 1970–1991 . . . . .	66
Figure 13. Growth rate of per capita cereal production, Asia-Pacific countries, 1970–1991 . . . . .	68

Figure 14. Per capita arable and permanent cropland, Asia-Pacific countries, 1970–1991 . . . . .	69
Figure 15. Percent of arable and permanent cropland that is irrigated, Asia-Pacific countries, 1989–1991 . . . . .	70
Figure 16. Average annual growth rate of irrigated area, Asia-Pacific countries, 1970–1990 . . . . .	72
Figure 17. Fertilizer use by country, Asia-Pacific Region, 1970–1991 . . . . .	73
Figure 18. Yields of total cereals, Asia-Pacific countries, 1970–1991 . . . . .	74
Figure 19. Yields of paddy rice, Asia-Pacific countries, 1970–1991 . . . . .	75
Figure 20. Yields of wheat, China and India, 1970–1991 . . . . .	76
Figure 21. Yields of corn (maize), Asia-Pacific countries, 1970–1991 . . . . .	77
Figure 22. Per capita calorie supply, Asia-Pacific countries, 1970–1990 . . . . .	79
Figure 23. Per capita protein supply, Asia-Pacific countries, 1970–1990 . . . . .	80
Figure 24. Brown and Kane projections of China's harvested grain area to 2030 and reported 1961–1992 figures . . . . .	83
Figure 25. World fish catch, total and per person: 1950 to 1993 . . . . .	89
Figure 26. Geographical boundaries of FAO marine statistical areas . . . . .	90
Figure 27. Pacific Ocean fish catch, 1983–1992 . . . . .	91
Figure 28. Aquaculture output for China and the world, 1984–1991 . . . . .	94

Figure 29. Fish catches by China and Japan: 1983–1992 . . . .	96
Figure 30. Fish catches, Asia-Pacific moderate catch countries: 1983–1992 . . . . .	98
Figure 31. Fish catches, Asia-Pacific small catch countries: 1983–1992 . . . . .	99

## List of tables

Table 1.	Estimated and projected population for countries of the Asian-Pacific Region, by sub-region and country: 1985 to 2010 . . . . .	133
Table 2.	Average annual population growth rate for countries of the Asia-Pacific Region, by sub-region and country: 1980 to 2010 . . . . .	134
Table 3.	Average annual population change for countries of the Asia-Pacific Region, by sub-region and country: 1980 to 2010 . . . . .	135
Table 4.	Total urban population for selected countries of the Asia-Pacific Region, by sub-region and country: 1980 to 2010 . . . . .	136
Table 5.	Population and average annual rates of growth for the highest density cities with a population of 2 million or more in 1992: 1992 to 2000 . . . . .	137
Table 6.	Total dependency ratio for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010 . . . . .	138
Table 7.	Child dependency ratio for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010 . . . . .	139
Table 8.	Public expenditures on education as a percent of GNP, selected countries: 1980 and 1990 . . . . .	140
Table 9.	Percent of population ages 15 to 24 for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010 . . . . .	141



Table 10.	Average annual growth rates of enrollment in secondary and higher education for selected countries in the Asia-Pacific Region: 1980-2010 . . .	142
Table 11.	Percent of population ages 25 to 64 for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010 . . . . .	143
Table 12.	Percent of population ages 65 and over for selected countries of the Asia-Pacific Region, by sub-region and country: 1990 to 2010. . . . .	144
Table 13.	Average annual outflow of Asian migrant workers by region and country of origin. . . . .	145
Table 14.	Number of refugees in selected Asia-Pacific countries by country of asylum and origin: 1991-1994 . . . . .	146
Table 15.	Asia-Pacific Region, growth in economies and agriculture. . . . .	147
Table 16.	Estimated and projected net grain import needs for developing countries in Asia: 1980-2030 . . . . .	148
Table 17.	World fish catch, total and per person, 1950-93. . . . .	149
Table 18.	Fish catches in major Indian Ocean and Pacific Ocean fishing areas: 1983-1992 . . . . .	150
Table 19.	Number of distant-water fishing vessels: 1985 to 1991. . . . .	151
Table 20.	Fish catches by countries or areas and major fishing areas . . . . .	152
Table 21.	Annual seafood consumption per person in selected countries, mid-1980s. . . . .	153

# Distribution list

Research Memorandum 95-230

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A1B UNSECNAV  
A1J ASSTSECNAV RDA WASHINGTON  
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A6 HQMC CMC  
A6 HQMC PP&O  
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B1B ASD/ISA  
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RAND SANTA MONICA  
SANDIA NATL LAB  
SECARMY  
SECAIR FORCE  
STATE DEPARTMENT  
USAF AIR UNIV  
USCG WASHINGTON DC  
USD/ACQUISITION  
USD/POLICY  
USSTRATCOM OFFUTT AFB NE  
USTRANSCOM SCOTT AFB IL